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TRANSACTIONS

OF THE

PHILADELPHIA

ACADEMY OF SURGERY

VOLUME III.

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TRANSACTIONS OF THE PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, January 8, 1900.

The President, DE FOREST WILLARD, M.D., in the Chair.

SARCOMA OF INTESTINE IN CHILDHOOD.

DR. RICHARD H. HARTE submitted the following history:

A male child, aged five years, was admitted to the Episcopal Hospital on October 31, under the care of Dr. Fisher, with whom the reporter saw the child in consultation. The abdomen of the patient was greatly distended, was very tympanitic, and a distinct mass could be felt on the right side, particularly in the right iliac fossa; slight palpation gave a great deal of pain. On deeper palpation the mass could be felt extending from the right iliac fossa over towards the median line and slightly above the bladder. At times, after the bowels were moved, the mass could be distinctly outlined as two nodular masses about the size of two lemons, one in the median line, and one, as before stated, over the right iliac fossa.

The history, as well as could be elicited from the family, was as follows: About four weeks previous the abdomen was noted to be becoming distended; although there can be no doubt but that the trouble existed long before this and was not recognized. There was no jaundice, no flushing of the face; tongue red and moist; the chest signs were negative; heart in its normal position and action regular; abdomen greatly distended and tympanitic. Over the region of the spleen the splenic dulness was slightly enlarged, although it was with difficulty this could be accurately determined. On the right side of the abdomen was a mass which was distinctly tender, the tenderness increasing down in the right iliac fossa and over towards the median line above the bladder. The child lay with the legs flexed, and when the legs

were extended the pain was increased. When the bladder was distended with urine pain was increased, which was relieved on evacuation of the bladder. The urine contained a faint trace of albumen, with no casts.

The blood count made by Dr. Ghriskey showed the following: Leucocytes, 21,300.

A differential count which was made three days later showed: Polymorphous nuclear leucocytes, 66.6 per cent.; small lymph cells, 24 per cent.; large lymph cells, 9.2 per cent.; eosinophiles, 2 per cent.

While under ether and with the abdomen relaxed, the mass was very much more apparent, and could readily be outlined occupying a space towards the right iliac fossa and extending beyond the median line. An incision was made, which was followed by the escape of a large amount of discolored serum. The growth seemed to be rather cystic in character, although with hard and distinct walls. In one spot it was very soft and ruptured on slight pressure, with more escape of bloody serum.

It seemed very apparent that the case was inoperable, and that nothing could be done except obtain a small piece of growth for microscopic purposes, which proved it to be a lymphosarcoma of the small round-celled variety. The wound was closed, a glass drain inserted, and for a time the child's condition seemed considerably improved; but he ultimately died from inanition, apparently due to the growth breaking into the intestine and allowing the escape of its contents. A post-mortem was made, which revealed a large sarcomatous mass occupying a position starting apparently from the mesentery and involving a portion of the small intestine, the two ends of which seemed to enter the mass, allowing the escape of the intestinal contents through the opening externally, which is very apparent in the specimen. The reporter considered this to be one of those cases of so-called intestinal sarcoma beginning probably in the mesentery, although this apparently is a very rare variety, the intestinal form being more common.

Albion (*Des Fibromes Embryonnaires de l'Intestin chez l'Enfant,* Paris, 1898) has collected ten cases of intestinal sarcoma in children, all of which were of the round-celled variety. The disease occurs at all periods of childhood, and may not infrequently be of congenital origin. Its evolution is extraor-

dinarily rapid, terminating fatally within two months after its apparent beginning. Heredity was noted in none of these cases. Direct traumatism was mentioned in two. The instances of metastatic foci in the viscera had been noted in three-fifths of the cases, in the liver and then in the kidney most frequently. The development of glandular metastasis in regions more or less distant from the primary focus had been noticed with equal frequency with the visceral metastasis, but in only one case was there general involvement of the lymphatic glands.

Again, Smoler (*Prag. med. Wochenschr.*, xiv, 1898), in discussing a series of thirteen cases of primary cancer of the intestines, thinks that they are always infiltrating in their character, affecting the entire intestine and increasing its size. They usually take up a considerable portion of the intestine. Histologically, they are sarcomata of mixed cellular type, although occasionally one sees a case that is lymphoid in character. Metastasis is frequent, affecting the lymphatic glands in the mesentery. The part of the intestine attacked was in seven cases the ileum, twice at its lower end and three times at the jejunum and ileum, and twice the cæcum, and in one case there was in addition an adenosarcoma of the pyloric end of the stomach. The majority of these cases were in the fortieth year.

RESECTION OF WRIST-JOINT.

DR. WILLIAM J. TAYLOR read a paper entitled "A Case of Resection of the Wrist-Joint by a Modification of Mynter's Method."

EXCISION OF THE WRIST BY A MODIFICATION OF MYNTER'S METHOD.

By WILLIAM J. TAYLOR, M.D.,

OF PHILADELPHIA.

At the eighth session of the American Orthopædic Association, held in Washington in 1894, Dr. Hermann Mynter, of Buffalo, read a paper upon excision of the wrist-joint by a new method, and described in detail an operation which he had performed some months before. This method had been suggested by Professor Studsgaard, of Copenhagen, in 1891, and consisted in making a longitudinal incision between the third and fourth metacarpal bones, and thus opening up the wrist-joint between the os magnum and unciform bones and between the semilunar and cuneiform bones. Both the superficial and deep palmar arches were cut, but easily ligated, in the wound. Dr. Mynter stated that he did not know whether this suggestion had been acted upon before, but that three months previously he had operated by this method upon a woman, aged thirty-five, with tubercular osteitis of the carpus. He made a slight change in the original proposition of Professor Studsgaard, however, in splitting the hand between the second and third metacarpal bones, and thus entering the wrist between the trapezoid and os magnum and between the scaphoid and semilunar bones, as by this incision the hand was more evenly divided. The dorsal incision reached up to the radius, and the palmar incision did not extend farther than the base of the thenar of the thumb. The annual volar ligament was, therefore, not severed. His description of the operation, and the ease with which the bones of the carpus could be extirpated with the scissors as well as the surfaces of the radius, ulna, and metacarpal bones by a small saw, made a very lasting

FIG. 1.—Tuberculosis of carpus. Skiagraph made just before operation of excision.

FIG. 2.—Skiagraph showing condition three months after excision of carpus for tuberculosis.

impression upon me, and I decided to employ this method at the first opportunity.

Dr. Mynter tells me in a letter dated October 21, 1899, that he has performed this operation twice since with perfect results; but these cases have not been published. He makes the statement that he splits the palmar surface only to the neighborhood of the superficial arch, and does not sever either arches nor open the palmar bursa.

I have tested this method in the following instance:

The patient is thirty-two years of age and a motor-man by occupation. The family history is good, with the exception that his father died of necrosis of the bones of the face. He had had the ordinary diseases of childhood, and when twelve years of age an abscess in the knee. Two years ago he had rheumatism. Shortly after this he noticed an abscess in his left shoulder, which finally discharged at two places on the arm; both these openings gradually closed, and now, beyond some scars, there is nothing remaining except an almost complete ankylosis of the left shoulder-joint. About two years ago he first began to have pain in the right wrist-joint, but he kept at work for nearly a year, the pain at times being better and at other times worse.

When I first saw him in September, the wrist was swollen and very painful, and had the appearance of typical tubercular arthritis of the wrist-joint. The fingers of the hand were stiff from inflammatory adhesions. He was admitted to the wards in the Orthopædic Hospital, September 20, 1899, and discharged October 21, 1899.

After placing him under the influence of ether and with the hand elevated, an Esmarch bandage was passed around the limb above the elbow, which effectively controlled the circulation. I made an incision upon the dorsum of the hand, extending from the radius downward between the second and third fingers, and split the hand and wrist, but exercised the greatest care not to carry my incision to the deeper tissues of the palm of the hand, nor to incise the sheath of the flexor tendons nor of the palm fascia. Neither of the palmar arches were cut, as I wished, if possible, not to make the palmar incision, and thus destroy the strength of the hand itself. I was astonished to see the facility

with which the wrist-joint could be exposed, and also to see that no tendons whatever were divided by this incision, except one tendon attached to the carpus itself. I was enabled to clean out all of the bones of the wrist, cut away the end of the ulna and radius with a saw, as well as the proximal ends of the metacarpal bones, and with scissors I was able to cut away a large amount of gelatinoid and tubercular tissue from the sheath of the tendons and intermuscular spaces. There was no need, whatever, for splitting the hand farther than this, and the operation was done

FIG. 3.—Photograph of anterior surface of wrist three months after excision of carpus for tuberculosis.

FIG. 4.—Photograph of posterior surface of wrist three months after excision of carpus for tuberculosis.

with as great ease and in as full view as an excision of the knee-joint.

The wound in the skin brought together with silkworm sutures, the tissues having first been brought together with cat-gut, and the dead space between the bones of the wrist and of the hand was packed with iodoform gauze. This was removed in three days, and a small amount of packing kept up at intervals until the wound entirely healed, which was in the course of about

three weeks. The hand, of course, was kept upon a splint. I regret very much at the time of operation I did not break up all of the adhesions in the fingers, as, since that time, we have had a great deal of trouble in overcoming this stiffness in the tendons and in the finger-joints themselves. I had a skiagraph taken of the hand before operation, as well as a skiagraph of the hand since the wound has been entirely healed. The result is most excellent. I do not think, without some such incision, it would have been possible to have gotten rid of the whole of the tuberculous bone, certainly neither Lister's nor any of the older operations would have accomplished the desired end so readily.

While he was in the hospital he complained of a great deal of cough, which was relieved by creosote, as well as of a painful swelling just to the left of the sternum over the third rib. After he left the hospital, this pain and discomfort continued and the swelling increased. He was again admitted to the hospital, ether given, a good-sized cold abscess opened, and a sinus found which extended out towards the left shoulder; this was thoroughly curetted and packed, and this wound is now about well. When he was under ether for this operation, opportunity was taken to break up the adhesions in his fingers, and, although they are still very stiff, considerable progress has been made.

The accompanying skiagraphs and photographs were taken by Dr. D. F. Weeks, the resident surgeon.

DISCUSSION.

Dr. H. Augustus Wilson remarked that the hand was still bandaged, and that immobilization was still maintained. He suggested that increased freedom of movement might increase the flexibility of the fingers and develop the muscles, thereby gaining usefulness of the hand. He said that this case had recalled to his mind a case of an elbow-joint, that was the most flail-like joint that he had ever seen, in which the muscles were educated to such coördination as to bring the arm into almost perfect use. This case of Dr. Taylor's is the most perfect excision of the wrist that he had ever seen; but there is a flail-like disability which might be overcome in the same way that the usefulness of the elbow referred to was re-established; although there are many obstacles in this case, for, besides the loss of function of

the wrist, there is an absence of animus, so essential to the successful accomplishment of the desired end.

Dr. Richard H. Harte said that the wrist is the most unsatisfactory joint in the body to excise. In the first place, the old methods of attacking the joint were always unsatisfactory, owing to the impossibility of getting at the joint without sacrificing the tendons of the muscles. The method practised by Dr. Taylor allows one to attack the joint by simply throwing the tendons to one side, so that one can practically then remove all the bones with the scalpel, forceps, or scissors. By the old method everything had to be removed piecemeal with forceps. The results in these cases, to his mind, were always very unsatisfactory. The cases, after they had had bones removed, dragged along for a long time, and it was a question if it was not always better to amputate the hand in the beginning rather than waste the time dragging along with the hopes of getting some results from a resection. One reason, he thought, why there is still so much impairment of function in this particular case is, that, having removed both rows of the carpus, the amount of fibrous tissue intervening between the bones of the forearm and the metacarpus is so great that it contracts very slowly. It is not like the removing of the same amount of bone in the forearm. There the contraction is very rapid, and the two ends of the bone are brought into relation at once, and there is practically no impairment of function of the muscle. But in this wrist there is nothing but tendinous tissue, and contraction is very slow. It is a flail-joint, and it will be some time before the patient will have the use of his hands as he had them before. Advantage might follow the use of some mechanical appliance which will act as a support between the lower end of the radius and the end of the metacarpal bone, and will increase the functions of the fingers very materially.

Dr. W. J. Taylor replied that repeated efforts had been made to do without some form of support. The man has also a perfectly ankylosed shoulder-joint on the left side; therefore, he is very much more helpless than a man would be who is able to use that arm. He is very much handicapped, inasmuch as he cannot get his right hand over to his left, and he begins by taking his right over to his left to enable him to do anything. Whenever all forms of support are removed, he is quite helpless with the two disabled limbs. He is able to get better motion in the

fingers if there is some form of support. He is getting daily massage at the Orthopædic Hospital; and he is therefore getting a great deal of exercise to the arm, wrist, and fingers. The amount of stiffness in the hand is much less to-day than it was before any operation was done. No very forcible methods to overcoming this stiffness were made at the time of operation. The second time he was etherized the hand was limbered up fairly well; but he is a man who does not bear pain very well; and he has so much the matter with him in addition,—a large abscess in his chest and tuberculosis of the lung, with almost constant pain and cough,—it has been impracticable to do more.

TRANSACTIONS OF THE PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, February, 1900.

The President, DE FOREST WILLARD, M.D., in the Chair.

ECHINOCOCCUS CYST OF THE LIVER.

DR. HIRAM R. LOUX reported a case of resection of the liver for echinococcus cyst as follows:

The patient was a German, aged thirty-one years, who two years ago, after some undue exercise, first experienced pain in right hypochondriac region, and soon thereafter discovered a hard mass in that region. He paid little or no attention to this until two months prior to his operation. When Dr. Loux was consulted in reference to this tumor, on examination, a hard, firm, somewhat nodular mass was felt in the right side just below the costal arch. By palpation the mass was freely movable. It had never occasioned any pain or discomfort except at the time when he first discovered the tumor. He has suffered somewhat, however, from indigestion. For some years past, his general health, as he states, has been below par, which he has attributed to the condition of his stomach.

An exploratory operation was advised, to which the patient consented, and on May 10, 1899, an incision was made over the most prominent portion of the tumor corresponding to the linea semilunaris. As soon as the abdomen was opened, it became clear that the tumor was hepatic. Its attachment was by a broad pedicle to the lower border of the left lobe of the liver. The tumor was somewhat firmly adherent to the adjacent tissues. After breaking up the adhesions and delivering the tumor through the abdominal wound, a resection of that portion of the liver structure to which the pedicle was attached was accomplished by the use of the Paquelin cautery. The peritoneal cavity was shut off by iodoform gauze, which was packed through the incision prior to the extirpation of the tumor. By burning through the liver

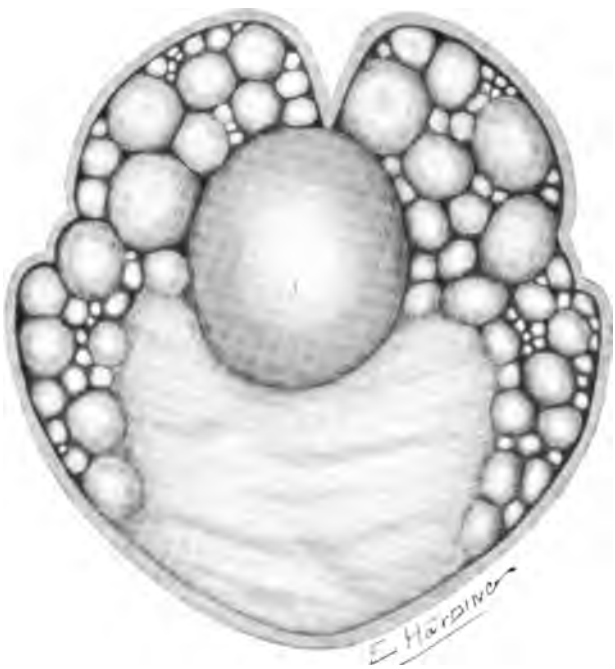


FIG. 1.—Hydatid cyst showing daughter cysts. In the lower part of the figure is a whitish mass containing parts of the wall of ruptured daughter cysts. The thick wall of the mother cyst is well shown. (Removed by Dr. H. R. Loux from liver of a man. The illustration is two-thirds the natural size. Weight, 197 grammes. The patient recovered.)

substance with the cautery heated to a dull red, about an inch and a half from the attachment of the pedicle of the tumor, there was no difficulty in controlling the bleeding. At points where the hæmorrhage was not arrested by the passage of the cautery, repeated applications of the point seared the surface superficially and arrested all bleeding.

The tumor was pear-shaped, eight centimetres in its longest diameter, five centimetres in its transverse diameter. Its weight 197 grammes.

The recovery was uninterrupted. The highest temperature was on the second day, when it reached $101^2/_5°$ F. On the third day after the operation there was rather a free discharge of bile through the abdominal wound, which continued about fifteen days, and gradually ceased. The wound completely granulated and closed at the end of three weeks.

The pathological report showed that had the cyst been detached from the pedicle, and a portion of the liver not removed, there would have been a strong probability of recurrence, for the microscopical examination revealed the fact that the interior of the cyst wall contained a large number of brood-capsules filled with scolices and connected with the parenchymatous layer, a condition which would predispose to recurrence had the pedicle not been removed.

The pathological report by Professor Coplin is as follows:

Specimen.—Tumor removed from within peritoneum adherent to the liver.

Specimen consists of a pear-shaped mass of tissue eight centimetres in its longest diameter, five centimetres in its transverse diameter. Weight, 197 grammes. Its external surface is rough, apparently as a result of having been detached from the adjacent tissue. Two centimetres from the smaller end there is slight constriction, which would appear to divide the specimen into two masses. On section, however, this constriction is seen to be present only on the surface. On longitudinal section, the knife first cuts through a very dense capsule two centimetres in thickness. This capsule is remarkably uniform in thickness and texture. Immediately within the capsule we come in contact with a large number of cysts apparently free within a cavity, that is unattached, but surrounded by a homogeneous matrix which closely resembles at the periphery the coagulated white of an egg. As we approach

the centre of the growth it changes from a cloudy-white opacity to a gelatinoid material quite as clear as ordinary gelatin used for culture purposes. Running through this gelatinoid tissue are bands one to two millimetres in diameter which are slightly more opaque than the surrounding matrix, and resemble in color threads of dried agar-agar. In consistency the material is soft:

FIG. 2.—Echinococcus. A group of scolices. (From Dr. Loux's case.)

FIG. 3.—Echinococcus. Scolex; *a*, pedicle of attachment to endocyst. Just above are shown the somewhat disarranged hooklets. (From Dr. Loux's case.)

it cannot be picked up by the fingers, as, when this is attempted, it falls to pieces. Embedded within this are the cysts above mentioned. By gently pulling apart this gelatinoid material we are able to count sixteen of these small cysts. The smallest is not over two millimetres in diameter, the largest an egg-shaped mass

three and one-half centimetres in its longest diameter, two centimetres in its transverse diameter. These cysts are perfectly transparent, and when opened are found to contain a clear, watery fluid, faintly alkaline in reaction, specific gravity, 1.007, and containing a trace of albumen and sugar. The walls of the cysts are very thin, and no macroscopic measurement is possible. A few of the cysts have been opened and the contents examined microscopically. There were found a few large endothelioid cells, few leucocytes, and cholesterin crystals. The wall was examined without finding anything characteristic, but examination of a smaller cyst demonstrated the abundant presence of innumerable echinococcus hooklets.

A further examination of scrapings from the interior of a cyst wall demonstrated very beautifully the brood-capsules filled with scolices and connected to the parenchymatous layer, the picture constituting an almost prefect reproduction of the left hand capsule, Fig. 437, p. 558, Ziegler's "General Pathology," 1895, ed. English translation.

Dr. Loux also presented abstracts of twenty cases of operations for hydatid cysts of the liver, compiled by Max. R. Dinkelspiel.

CASE No. 1.—*Reference,* O'Conor, *Glasgow Medical Journal,* Vol. xlvii, p. 347. Female, aged fifty-one years. *Nature, size, and duration,* hydatid cyst. *Method of removal,* hepatotomy, three-inches incision, slightly external to right, semilunar line. Trocar inserted. Blunt-pointed bistoury passed alongside of trocar and one-half-inch incision made into liver substance. *Result,* death on day following operation. *Remarks.* Enormous hæmorrhage arrested by sponge pressure.

CASE No. 2.—*Reference,* Morgan, *London Lancet,* 1895, Vol. i, p. 344. Female, aged thirty-eight years. *Nature, size, and duration,* hydatid cyst; four years. *Method of removal,* vertical incision over tumor in right linea semilunaris; cyst wall dissected away with forceps. Bleeding stopped by ligatures and hot sponges. *Treatment of stump,* intraperitoneal. *Result,* recovery in three weeks. *Remarks.* Enough small cysts to fill a pint bowl; cysts varying in size from that of a pin's head to a cherry.

CASE No. 3.—*Reference,* Loretta, *Mem. della R. accademia dell' Scienze dell' Instituto di Bologna,* 1886-1888, quarta tomo

viii, p. 581, in *Boston Medical and Surgical Journal,* April 28, 1892. Male, aged forty years. *Nature, size, and duration,* two years; echinococcus cyst; size of fœtal head. *Method of removal,* bistoury. *Treatment of stump,* edges of capsules of Glisson stitched together and also to abdominal wall. Collodion and iodoform dressing. *Result,* recovery. *Remarks.* Diagnosis, suspected echinococcus.

CASE No. 4.—*Reference,* Brazil, *London Lancet,* March, 1897, Vol. i, 624. Female, aged thirty-two years. *Nature, size, and duration,* hydatid cyst; duration about one and three-quarters years. *Method of removal,* first operation, October 4, 1886; no cyst found. October 13, 1886, incision three inches long over eighth rib in mid-axillary line; one inch of rib resected, leaving periosteum, and cyst wall removed. *Result,* recovery. *Remarks.* Two ounces of fluid evacuated.

CASE No. 5.—*Reference,* Bobroff, Khirurgia Mosk., in *Centralblatt für Chirurgie,* 1897, p. 1115. Female, aged twenty-five years. *Nature, size, and duration,* echinococcus alveolaris; four months' duration; fourteen centimetres in diameter, weight 200 grammes. *Method of removal,* excision; floor of excision still of tumor substance. Iodoform gauze tampons. *Treatment of stump,* extraperitoneal. *Result,* recovery in forty days. Recurrence. *Remarks.* Two previous childbirths followed by apparent right inguinal adenitis.

CASE No. 6.—*Reference,* Bruns, *Revue de Chirurgie,* No. 12, 1896, p. 976; *Beiträge klin. Chirurgie,* 1888; *Pennsylvania Medical Journal,* October, 1897. Female, aged forty-four years. *Nature, size, and duration,* echinococcus cyst in lobus quadratus. Size, child's head. Duration, seven months. *Method of removal,* cautery. Ligation of pedicle. *Treatment of stump,* disinfected with $HgCl_2$ and return to abdominal cavity. *Result,* recovery in nineteen days. *Remarks.* Diagnosis, tumor of mesentery or omentum.

CASE No. 7.—*Reference,* Garre, *Beiträge klin. Chirurgie,* 1888, Band iv, p. 181. Female, aged forty-four years. *Nature, size, and duration,* echinococcus cyst. *Method of removal,* thermo-cautery. *Treatment of stump,* returned to abdominal cavity. *Result,* recovery. *Remarks.* Tympanites.

CASE No. 8.—*Reference,* Landouzy and Segond, *Bulletin de la Société de Chirurgie de Paris,* 1887, No. 13, see *Pennsylvania*

Medical Journal, October, 1897. Male, aged fifteen years. *Nature, size, and duration,* echinoccoccus cyst. Duration, three months. *Method of removal,* abdominal section. Aspiration. Removal of cyst wall and liver tissue covering cyst. *Treatment of stump,* liver attached to abdominal wall by two silver sutures. Drainage. *Result,* recovery.

CASE No. 9.—*Reference,* Depage, *Gaz. hebd. de Méd. et de Chirurgie,* March 13, 1898, from ANNALS OF SURGERY, September 13, 1899. Female, aged twenty-two years. *Nature, size, and duration,* hydatid cyst in quadrate lobe, three others in left lobe, all size of the fist and of five years' duration. *Method of removal,* incision across rectus abdominis. Resection of part of left lobe with Paquelin cautery. Cyst in quadrate lobe enucleated; packing and drainage-tube. *Treatment of stump,* intraperitoneal. *Result,* recovery in fifteen days. *Remarks.* At first infection with Bacillus coli communis. Small fistula, which closed later.

CASE No. 10.—*Reference,* S. White, *British Medical Journal,* 1897, Vol. ii, p. 398, from ANNALS OF SURGERY, September, 1899. Male, aged seventeen years. *Nature, size, and duration,* "some time." Hydatid cyst under surface of left lobe. Size of a cocoanut. *Method of removal,* adhesion separated, cyst excised at base. Closure with six deep silk sutures. Hæmorrhage stopped by pressure. *Treatment of stump,* returned to peritoneal cavity. *Result,* recovery in short time. *Remarks.* Cyst dark red and looked like a malignant tumor during operation.

CASE No. 11.—*Reference,* Ruggi, *British Medical Journal,* April, 1892, p. 408. Female, aged twenty-two years. *Nature, size, and duration,* double echinococcus cyst; two years' duration; oblique diameter about nineteen centimetres. *Method of removal,* eighteen by ten inches of liver excised; vessels tied with catgut. *Treatment of stump,* edges of cavity sutured to the peritoneal edges of the abdominal wound. External treatment. *Result,* recovery. *Remarks.* Diagnosis, echinococcus of kidney.

CASE No. 12.—*Reference,* Palleroni, *Centralblatt für Chirurgie,* 1898, p. 1110; *Gaz. hebd. de Méd. et de Chir.,* 1898, p. 805. Female, aged fifty-five years. *Nature, size, and duration,* echinococcus cyst; size of hen's egg; adherent to gall-bladder. Noticed about one year. *Method of removal,* cyst dissected out and hæmorrhage arrested by tampons. Liver held to abdominal wall by silk thread. *Treatment of stump,* intraperitoneal. No drain-

age. *Result,* recovery. *Remarks.* Walls of cyst partially calcified.

CASE No. 13.—*Reference,* Igmio Tansini, *British Medical Journal,* 1891, Vol. i, p. 81. Female. *Nature, size, and duration,* hydatid cyst. *Method of removal,* total extirpation; excision of a portion of the liver. *Treatment of stump,* wound closed with sixteen sutures, some being catgut, others silk. *Result,* recovery within fourteen days. *Remarks.* No post-operative complications.

CASE No. 14.—*Reference,* Boggi, *Wiener med. Presse,* No. 21, 1889. Abstracted from "Progress of Medical Sciences," September, 1889, p. 300. Female. *Nature, size, and duration,* double echinococcus cyst weighing three pounds. *Method of removal,* enucleated. Resection of three inches of liver parenchyma. *Treatment of stump,* edges of liver cavity secured in abdominal wound. *Result,* recovery. *Remarks.* Free discharge of bile through the wound.

CASE No. 15.—*Reference,* Jones, *London Lancet,* 1894, Vol. i, p. 860. Female, aged twenty-one years. *Nature, size, and duration,* hydatid cyst six months, contained 124 ounces of fluid. *Method of removal,* incision middle line three inches long, one and one-half inches below ensiform cartilage; cyst incised and portion of cyst wall removed; drainage. *Treatment of stump,* cyst wall stitched to abdominal incision. *Result,* recovery four months. *Remarks.* Small pieces of cyst's wall came out of abdominal incision for four months.

CASE No. 16.—*Reference,* Vohtz, *Hospitals Tidende,* 1889. pp. 610-615. In ANNALS OF SURGERY, 1890, Vol. xi, p. 288. Female, aged twenty-one years. *Nature, size, and duration,* echinococcus cyst; size of child's head; duration "some time." *Method of removal,* excised with a portion of greatly atrophied liver tissue. *Treatment of stump,* intraperitoneal. *Result,* recovery.

CASE No. 17.—*Reference,* O'Conor, *Glasgow Medical Journal,* Vol. xlvii, p. 343. Male, aged ten years. *Nature, size, and duration,* large hydatid cyst. *Method of removal,* three-inches incision right semilunar line; trocar inserted and cyst evacuated. *Treatment of stump,* marsupialization. *Result,* recovery. *Remarks.* Ten pints fluid removed.

CASE No. 18.—*Reference,* Pozzi, *Gazette Méd. de Paris,* June,

30, 1888; also *Cong. Franc. de Chir. Proc. Verb.*, 1888, in *Boston Medical Journal*, April 28, 1892, p. 545. Female, aged thirty-four years. *Nature, size, and duration,* large echinococcus cyst. *Method of removal,* scissors. *Treatment of stump,* ligature, thermocautery, suture of liver in abdominal wound. Drainage. *Result,* recovery. *Remarks,* Discharge of bile and renewed liver tissue through drain.

CASE No. 19.—*Reference,* Smith, *Lancet,* February 18, 1887, Vol. i, p. 265. Female, aged forty-eight years. *Nature, size, and duration,* suspected hydatid cyst containing six ounces of fluid; five months' duration. *Method of removal,* No. 1 trocar and canula inserted into centre of fluctuating area. *Result,* rapid recovery. *Remarks.* No hooklets found.

CASE No. 20.—*Reference,* J. Chalmers Da Costa, present paper. Female, aged twenty-nine years. *Nature, size, and duration,* suppurative hydatid cyst. *Method of removal,* incised. *Result,* death.

Dr. Loux also submitted the following table showing the relative fatality when cysts are left to burst spontaneously, compiled by Cyr and published in the "Annals of Universal Medical Sciences," 1888, page 331.

In cysts bursting into peritoneum, 90 per cent. are fatal; into pleura, 80 per cent.; into bile ducts, 70 per cent.; into bronchial tubes, 57 per cent.; into stomach, 40 per cent.; into intestines, 16 per cent.; through abdominal walls, 10 per cent.

DR. W. M. L. COPLIN said that most of the echinococcus cysts which are met with by pathologists in this country are inspissated, that is, the parasite is dead, the fluid more or less completely absorbed, and the cavity occupied by a mass of detritus resembling the product caseation. Such cysts are not infrequently found post-mortem. In the last few years he had seen maybe four or five. The form of cyst that would be of interest to surgeons is the kind presented by Dr. Loux,—the true hydatid. Of these he had been fortunate enough to see a number. He had also seen one or two operations done with the belief that a hydatid was present, and although present it was not found. He recalled one in which numerous exploratory tappings were made without finding fluid, although Professor Bartholow was sure of the diagnosis. He followed the patient until he died and made the post-mortem. He found a cyst which contained a gallon

of fluid. The entire liver was in front of the cyst. Of course, all the tappings had been made into the hepatic structure. It was a case in which it would have been necessary to go entirely through the liver to find the cyst cavity; it could have been reached from behind. The cyst was unilocular, a simple hydatid. More commonly the cyst contains daughter and, quite often, grand-daughter cysts.

Of the symptomatology of hydatid cysts little is known. The patients of whom he had had any knowledge always complained of some digestive disturbance. The danger recognized by the older writers and by many of the older surgeons, where operation was never thought of, was suppuration. But why should suppuration occur? Commonly the cyst will form and progress with but few symptoms, or it may be none at all, and then suddenly all the phenomena usually associated with an intense infective lesion of the liver will occur. The suppurative process is shown by the usual evidences of intense infection. An operation at this time usually shows a suppurative cholangitis; sometimes the gall-bladder is involved; but usually it is a suppurative cholangitis following the course of the larger biliary ducts, even involving the smaller canals, and is occasionally mapped out upon the surface of the organ. Sometimes on the surface of the liver will be seen faint pencillings, the lines of infection as they travel along the course of the biliary and interlocular tissues. Commonly the lines of suppuration follow the course of the biliary canals. Investigation into the case to which he referred had led him to believe that the suppuration has not originated in the cyst, as was the older view, but that it is a suppurative cholangitis pure and simple. What relation the cyst has to it he did not know, unless it is that the cyst is a source of obstruction. We know that an obstruction of any amount in the gland is commonly followed by suppuration, often resulting from the most trifling causes. Very often a history of trauma in these cases is followed by suppurative cholangitis.

In the present cyst he had been able satisfactorily to demonstrate the brood-capsules with their contained scoleces. The capsules are all ruptured, but the scoleces are still in position. The specimen came into the laboratory at a time when the laboratories were in process of reconstruction, the buildings were torn down, and he could not try feeding experiments, but he did not doubt

that all the scoleces were still living. As illustrating the fact that where the patient develops hydatids without suppuration, or without inspissation or death of the parasite, there is absolutely nothing to hope for in any other treatment than that afforded by surgery, the observation of Leidy should be recalled. A cadaver came to the dissecting-room in the University. A student called Professor Leidy's attention to the cyst, and he was able to demonstrate that the brood-capsules were still living and able to infect, although the body was injected with chloride of zinc and had been preserved for a considerable time. Of course, if one cannot reach the parasite in the liver when a body is injected with chloride of zinc, post-mortem, not much can be expected from medical treatment during life. The usual course in nearly all of these cases is, with a trifling injury or without it, a suppurative cholangitis which terminates fatally. He had never known of an instance of suppurative cholangitis, of this origin, where the patient recovered.

PANCREATIC CYST.

Dr. John B. Deaver reported the case of a woman, aged fifty-eight years, who was admitted to the German Hospital, August 2, 1899, on account of an illness which had been developing during twelve or fifteen years. At first she noticed that she was losing her shape and was becoming stouter. This has kept up until the present time. She has always had regular habits; has never had attacks of epistaxis or hæmatemesis. Has suffered from small bleeding hæmorrhoids ever since the age of eighteen years. During the past few years has always been constipated, and at times has had some frequency and difficulty of micturition. Two years ago had a prolapse of the vagina, since which time she has used a vaginal stem pessary, which has relieved her. With all the above trouble she has felt in the best of health, took exercise regularly, and has always had a moderately good appetite.

On admission her temperature and pulse were normal. Heart and lungs clear. Her abdomen was greatly enlarged; fifty-two inches in circumference on a level with the umbilicus. The superficial veins were enlarged and tortuous, with apparently an increased fulness upon the right side high up. There was a general fluctuation, with deep-seated tympany in the right flank, with dulness but not flatness in the left flank, flatness anteriorly over the abdomen reaching as high as the ensiform cartilage;

the area of dulness not changed by any change of position. At a point two inches below and one to the left of the ensiform cartilage a thin plate of cartilage could be felt, apparently situated somewhat deeper than the abdominal wall. The liver was slightly diminished in size, and was pushed up as high as the fifth interspace anteriorly. Heart sounds, good; apex beat pushed slightly upward and to the left.

Operation, August 23.—Upon opening the abdomen, four gallons of a yellowish oily serum were evacuated, and a large cyst was revealed high up beneath the liver on the right side. The cyst was post-peritoneal, and was found to be adherent to the anterior abdominal wall. The peritoneal cavity was swabbed out with large pieces of sterile gauze; when dry it was packed with sterile gauze to maintain pressure upon the abdominal vessels. The abdominal incision was then continued upward to the left of the umbilicus, reaching within two inches of the ensiform cartilage. The abdomen was further explored to determine the advisability of removal of the cyst. Abdominal protective gauze removed and abdominal wound closed with drainage of pelvis. Cyst aspirated and about 500 cubic centimetres of fluid removed, the remaining portion being too thick to flow freely. The cyst wall was incised for a distance of one and one-half inches, allowing fully two and one-half quarts (2500 cubic centimetres) thick, fatty, yellowish fluid to escape (the cyst was about ten inches in diameter); its walls were thick and fibrous; at points there existed plates of cartilage which projected into the cavity. The cyst cavity was sponged dry, and finally packed with four large strips of iodoform gauze. A glass drainage-tube was inserted. Recovery followed.

Dr. Deaver said that the remarkable point in this case was that this trouble dated back twelve years, and, barring the size of the abdomen and the discomfort referred to the vagina and bladder and due to the pressure of the intra-abdominal fluid, she did not suffer any inconvenience; the bowels were regular; appetite good; she slept well, and, notwithstanding the fact that the heart and lungs were trespassed upon, she suffered no inconvenience referable to the chest. He had seen the patient recently, and found her feeling perfectly well.

Dr. Thomas S. K. Morton reported that the case of pancreatic cyst which he detailed to the Academy, March 6, 1899 (Annals of Surgery, June, 1899, p. 760), was still doing ex-

cellently. It was now more than eighteen months since the operation, and she had, some six months since, given birth to a healthy child. The cicatrix remains firm, and she experienced no complications or discomfort from her old trouble with the pancreas during or after the pregnancy. She has gained and retains much flesh.

CARCINOMA OF THE BREAST.

DR. JOHN B. DEAVER presented a specimen of carcinoma of the breast removed from a woman, aged twenty-two, saying that the only point regarding the specimen of interest, other than the removal of the breast from so young a person, was the manner of removal. He cut wide of the growth, dissecting down on the great pectoral muscle, removing the sternal portion of it with the lesser pectoral, cleaning out the armpit, following up the vessels to the lower border of the collar-bone, the last step being the removal of the breast. The glands as far up as the collar-bone were infected. He had been struck by the amount of usefulness of the arm that shortly follows such operation. That is a point about which he was a little sceptical when he read the early reports of these operations to the effect that the function of the arm was very good. But he had the opportunity of observing one young woman who was operated three years ago and afterwards was employed in the German Hospital laundry. She could do as much work with the arm of the same side from which the breast was removed as she could with the other arm. He insists upon the patient using the arm.

As to the œdema which frequently follows the operation. Immediate œdema is not due to pressure on the axillary vein, but to the lack of support occasioned by the extensive dissection; œdema making its appearance later is usually the result of pressure upon the axillary vein from recurrent wall. He had seen a number of instances where œdema has appeared early; this has prompted him to allow the patients to use their arms early.

DR. W. M. L. COPLIN said that he had had an opportunity to watch a number of these cases dating back to the early "dinner-plate" operation of the late Professor Gross, for whom he did pathological work. The later results, statistical and from a pathological stand-point, fully justify the wide operations which modern surgeons are making. The necessity of avoiding the track of invasion, from a pathologist's stand-point, is eminently proper. No matter whether one believes in the microbic origin of car-

cinoma or that it is a form of cellular parasitism, the track must be avoided. A surgeon would not think of making an amputation through the line of infection if it could be avoided, and the wisdom of avoiding the track of invasion in cancer seems to be equally important.

There is one point with regard to these tracks of invasion which physiologists have only partly worked out, viz., anomalous distribution of the lymphatics or unusual lymphatic connection. He had seen one case of anomalous track of invasion in which primary cancer of the lower and outer quadrant of the mammary gland was associated with glandular enlargement in the supraclavicular fossa without axillary involvement. The patient was first operated on in Europe, and was afterwards in charge of the last Professor Gross. In this case the axilla was cleaned out,—the second operation,—and there was no axillary glandular involvement, although such involvement was present along the course of the lymphatics above the clavicle and in the gland back of the sterno-cleido-mastoid muscle. Cancer is also seen occurring in the genital organs and associated with retroperitoneal invasion, the glands of the groin escaping. Such anomalous distribution of the lymphatics and distribution of recurrences are probably to be accounted for as due to congenital peculiarities, although the view may be taken that occlusion of the lymph stream travelling towards the axilla may lead to collateral dissemination.

CARCINOMA OF THE RECTUM.

DR. DEAVER presented four specimens of carcinoma of the rectum, all removed by a modified Kraske operation. All made uneventful recoveries. Two of the patients in whom he succeeded in suturing the divided bowel had sphincteric action; the other patients had not. He had already put himself on record as against preliminary colotomy in an operation for the removal of the rectum in the majority of cases. None of these cases were very sick after the operation. He had never seen the loss of very much blood in this operation, and he thought that the reason of this was that he took out the lower three or four segments of the sacrum, dividing the bone transversely with chisel; then with a pair of scissors curved on the flap, hugged the under surface, cutting the ligaments and dividing the blood-vessels near their termination.

FIG. 1.—Tuberculosis of the carpus.

TRANSACTIONS OF THE PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, March 5, 1900.

The President, DE FOREST WILLARD, M.D., in the Chair.

TUBERCULOSIS OF THE CARPUS—EXCISION.

DR. ROBERT G. LE CONTE presented a man, twenty-two years of age, who, after a sprain of the wrist sustained six years ago, developed tubercular disease of the carpus. For two years a discharging sinus had been present. A radiograph (Fig. 1) shows the disease to have involved not only the carpus, but the adjacent portions of the radius and ulna and of the fourth and fifth metacarpal bones.

The reporter said that in 1891 Professor Stutgart, of Copenhagen, exhibited a resection of the tarsus, in which he had split the foot between the metatarsal bones, in order to thoroughly expose the tarsal bones. At the same time he suggested that the wrist-joint might be well exposed by splitting the hand completely between the metacarpal bones. This suggestion was taken up by Mynter in 1894. Stutgart advised the complete splitting of the palmar and dorsal surfaces of the hand, cutting between the metacarpal bones down to the carpus. Mynter modified this by splitting the palmar surface only to the metacarpophalangeal joint, and then splitting the whole of the dorsal surface down to the radius. He advocated going between the second and third metacarpal bones.

Dr. William J. Taylor, in doing the operation this fall, still further modified it by limiting the incision to the dorsum of the hand, and opening between the third and fourth metacarpal bones. The incision extended a little beyond the metacarpophalangeal articulation down to the radius. Dr. Le Conte followed Dr.

Taylor in doing this excision. After the dorsal incision on the hand is made, the dorsal and palmar ligaments holding the third and fourth metacarpal bones together are divided and the two bones forcibly separated from each other. With a knife the carpus is now disarticulated from the metacarpus, and by pulling the hand down, the carpus is forcibly dislocated backward. The palmar surface of the carpus is then freed from the soft parts by dissection until healthy bone is encountered in the radius and ulna. After reaching the limit of the disease, the radius and ulna are divided with a saw or forceps. This removes the whole carpus and the radio-ulnar articulation in one piece. If the disease has extended to the metacarpal bones, they are individually resected. All tubercular material is now dissected away from the tendon sheaths and the adjacent soft parts. The incision is then closed and the resulting cavity loosely packed with iodoform gauze. The advantages of this operation over the older methods of excision seem to be these: that one can treat the carpus as one bone instead of picking it out piecemeal, that there is little danger of cutting tendons except those attached to the carpus, and that the exposure of the parts is so free that all tubercular material is easily dissected away from the surrounding soft parts, leaving a clean wound which heals promptly.

DR. W. J. TAYLOR remarked that the advantage of the method of operation illustrated in Dr. Le Conte's case is that it gives greater facility, greater ability to get at and remove all the diseased tissue. By this incision one can absolutely turn out the bones from the joint; one can expose every nook and cranny and can cut out with the scissors every particle of tubercular disease. Then, too, a saw can be used to cut the ends of the radius and ulna, and exposure of the joint and of all the surfaces is made quite as well as in the ordinary excision of the knee. The patient he showed to the Academy in January, upon whom he had operated, has developed a general tuberculosis now. His other wrist is involved, his shoulder is involved, he has had a large tubercular abscess in his chest, and his lungs are very much involved in the disease. Although this has not been a favorable case for the ultimate good results, yet the very large dead space between the ends of the shortened metacarpal bones and the radius and ulna has steadily diminished. When seen a few weeks ago, he had very much less motion in the wrist than when he was here, show-

FIG. 2.—Tuberculosis of the carpus.

ing that the fibrous tissue was filling up and the dead space was contracting.

CARCINOMATOUS DEGENERATION OF UTERINE MYOMA.

Dr. Robert G. Le Conte presented a specimen of large intraligamentous fibromyoma of the uterus with endometrial carcinoma of the fundus. The specimen had been removed from a woman, aged thirty-six years, who was admitted to the Pennsylvania Hospital January 20, 1900, well nourished, but very anæmic from profuse bleeding from the uterus. A blood count showed red cells, 2,000,000; white, 7400; marked poikilocytosis, hæmoglobin, 18 per cent. A large, smooth, firm, movable tumor extended from the pelvis to two inches above the umbilicus. Vaginal examination revealed a normal cervix with a virgin os, which was continuous with the tumor above. The patient was placed at absolute rest, with the most nourishing of diet, ferruginous pills, and 1/100 of a grain of atropia sulphate three times a day. At the end of a week the bleeding had practically ceased. February 28, hæmoglobin had reached 57 per cent.; March 2, the tumor was removed. It was almost entirely covered by a greatly hypertrophied broad ligament It filled the whole of the pelvis, making it impossible to reach the vessels until the broad ligament had been completely split across. The uterus was amputated at the internal os, the stump closed, and the broad ligaments whipped together with catgut. Dr. Cattell, pathologist to the hospital, reports as follows:

The specimen can best be described as composed of two parts, the one a large myofibroma, the other the uterus, with cancerous degeneration of the fundus extending down within three-quarters of an inch of the cut portion. The weight of the mass is four pounds fourteen ounces, the length eight inches, and the width seven and one-half inches. Microscopically, the cancer is of the glandular variety, the acini are long and tortuous, and in places well filled with epithelial cells arranged in layers.

At the time of operation there was nothing to suggest cancer, or a complete hysterectomy would have been done. The point of interest now is whether the stump of the cervix should be removed, or whether an amputation three-quarters of an inch away from diseased endometrium is a sufficient safeguard to the

patient. Of all the situations in the body, carcinoma of the fundus uteri is by far the most favorable, and operation has been followed by the largest proportion of cures. Dr. C. B. Penrose recently told the reporter that he had three times amputated the uterus at the internal os for causes other than cancer, and that an examination of the specimens later revealed carcinoma of the fundal endometrium. In each case he had gone beyond the disease for half or three-quarters of an inch, and none of the patients would consent to a second operation. The last patient was operated on four years ago, and all are living and well, and free from a return of the disease.

DR. BEYEA said that he remembered very well the three cases operated upon by Dr. Penrose, referred to by Dr. Le Conte, having himself made the microscopical studies of the growths. In all three the malignant disease was in a very early stage of development; in fact, there was some question of doubt as to the actual presence of such a change. The endometrium showed the microscopical changes characteristic of the diffuse hyperplastic or fungoid endometritis described by Olshausen, but in the deeper portion of the endometrium the glandular proliferation was so great that it seemed to be breaking through into the stroma tissue. They were cases of hyperplastic endometritis in which there was a strong suspicion of beginning malignant adenomatous change. There was no positive diagnosis of malignant adenoma. They were not adenocarcinoma or medullary carcinoma. For these reasons they can scarcely be of value in considering the danger of leaving the cervix behind when there is carcinoma of the body of the uterus. Carcinomas of the body of the uterus, however, rarely infiltrate into the cervical tissue, but, beginning in the corporeal endometrium, infiltrate and destroy the muscle wall of the body, and finally break through the peritoneum. In one instance he had observed the muscle tissue of the body quite completely destroyed by the carcinomatous disease, which formed nodules beneath the peritoneum and distorted the shape of the uterus. Even here the cervical tissue was normal. The patient has now been free from recurrence five years. He would say from his experience and microscopical studies of these cases that it is quite improbable that there will be a return in Dr. Le Conte's case. The association of carcinoma with myofibroma of the uterus has not

infrequently been reported. He had observed three such cases. Last year he had under his care a woman who had a carcinoma of the cervix with a large multinodular fibroid of the fundus. The case was an inoperable one; the infiltration extending into the broad ligaments. Another case was that of a woman operated upon some four or five years ago. There was an interstitial fibroid nodule the size of a baseball at the fundus, and an advanced malignant adenomatous disease arising in the endometrium and destroying the muscle wall of the uterus. Here, too, the cervix was normal. It was the only typical case he had seen of that form of malignant disease which Ziegler described as adenoma destruens. The gland spaces were irregular, one breaking through into another, and they were lined with a single layer of cylindrical epithelium. Nowhere did the cells fill up a gland space or present the change characteristic of adenocarcinoma. He believed this to be an extremely rare form of carcinoma of the uterus.

TRANSACTIONS OF THE PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, April 2, 1900.

The President, DE FOREST WILLARD, M.D., in the Chair.

PYOPNEUMOTHORAX WITH GREENSTICK FRACTURE OF THE RIBS.

DR. FRANCIS F. STEWART related the following case, occurring in Dr. Hopkins's service at the Pennsylvania Hospital, of incomplete fracture of the fifth and sixth ribs, complicated by pneumothorax, and terminating in death from croupous pneumonia of the opposite side ninety days after the original injury.

A boy, aged six years, was admitted to the hospital immediately after having been struck by the wheel of a coal-cart. The surface was cold and sweaty, the temperature being 97° F., the pupils dilated, the pulse weak and rapid, 144 to the minute, and the respiration 30 and jerky. Great pain and tenderness were complained of all over the left chest, which did not respond to inspiratory efforts. Fracture of the ribs could not be demonstrated. There was neither spitting of blood nor emphysema. The chest was immobilized with adhesive plaster, stimulants administered, and external heat applied. The temperature subsequently rose and fluctuated between 102° and 104° for thirty-three days, when it reached the normal point. The pulse undulated with the temperature. The respirations were embarrassed and averaged 40 to the minute until the chest was opened, when they subsided to the normal. The urine contained a trace of albumen and a few granular casts.

At the end of twenty-four hours the whole left chest was distended with air, the cardiac apex being displaced to the fifth right interspace. Dyspnœa with a short, unproductive cough was noted.

On the fifth day, the conditions not having improved, about four quarts of air and four and one-half ounces of bloody serum were aspirated from the seventh interspace, midaxillary line. Considerable emphysema of the chest wall followed the withdrawal of the needle. This persisted for three days.

On the twelfth day a pneumonia of the right apex developed.

The improvement following the primary aspiration was of short duration, the distention returning and increasing until the thirty-first day, when the heart pulsations could be felt at a point two inches to the right of the sternum. The chest was again aspirated, a large quantity of air with a few drachms of pus being withdrawn.

On the thirty-third day, the signs and symptoms persisting, a rubber tube was introduced through an incision in the sixth interspace, postaxillary line, and about eight ounces of pus and much air evacuated. The temperature immediately fell to normal, the respirations became quiet, and the boy grew progressively

Incomplete fracture of rib.

better until the seventy-sixth day, when he was discharged, the wound having closed, the heart returned to the normal site, and the pulmonary resonance and breath sounds having approximated the normal.

Nine days later he was re-admitted with a fully developed croupous pneumonia of the lower right lobe. He died four days later, on the fifth day of the pneumonic process, and ninety days after the original injury.

The post-mortem disclosed a red hepatization of the lower right lung. The left lung was collapsed, about one-fourth the size of the right lung, and lay in the upper part of the thorax close to the vertebral column. It was dark in color and almost airless, the splenization of the pathologists. The remaining portion of the pleural cavity was filled with air contained in large balloon-like sacs made of lymph. The fifth and sixth ribs were firmly glued together by soft callus and were identical in appearance,

in each the internal bony cortex had given way in the postaxillary line. The fifth rib was resected for closer examination. Nothing worthy of note was discovered in the other organs.

The rarity of partial fractures of the ribs, especially in children, is questioned by many authors, but few have had the opportunity to demonstrate it by autopsy. The "International Encyclopædia of Surgery" mentions a child who, dying of ruptured lung, was found to have sustained a greenstick fracture of two or three ribs on each side. Rib fracture is uncommon in childhood owing to the great elasticity of the thoracic cage, but when it does occur, one would think the conditions ideal for an incomplete fracture. The diagnosis would be almost impossible to make, crepitus, deformity, and preternatural mobility being absent. Costal fracture was believed to have occurred in this case, but its situation could not be localized, although each rib was carefully palpated and an X-ray plate made. The specimen shows the break filled by soft callus, the lower edge and the lower half of the internal plate having yielded as a result of the direct force of the impinging cart-wheel.

Pneumothorax must be a very infrequent complication of fractured ribs even when the lung is punctured. This is the only case in 175 of which we have knowledge. West has proven experimentally that there is a strong coherence between the pleural laminæ, not accounted for by the elasticity of the lung, and which is adequate to hold them in contact even though the pleural sac be opened. The lung is also often held to the chest wall by adhesions. Panas asserts that 25 per cent. of all adults have pleural adhesions.

The mechanism of the production of the pneumothorax is not quite clear. Puncture of the lung by the ribs would have probably caused an external emphysema, unless the intercostal structures remained intact. It is not inconceivable that it should have been due to a rupture of the air-vesicles, the result of a sudden severe blow dealt the chest when the lung was hyperdistended, as at the end of a deep inspiration preparatory to a cry of fright. Osler mentions a case which followed heavy lifting.

Air may enter the pleural sac through the chest wall or from a tracheotomy wound, causing a mediastinal emphysema and ultimately a pneumothorax. Money has observed two such cases in twenty-three tracheotomies, and lays down the rule that

the deep fascia should never be raised from the windpipe. It may come from the colon, stomach, or œsophagus, as a result of suppurative or malignant disease. It may be produced by ærogenetic micro-organisms in a suppurative pleurisy. And it may emanate from the lung either from intrinsic disease or from external disease or trauma. Ninety per cent. of all the cases are due to phthisis.

Concerning the diagnosis, the Röntgen ray will contribute, in doubtful cases, to reaching a conclusion, an intense clearness being produced over the air-sac.

The treatment should be the same in all cases, be the cause what it may. So long as respiration is unimpeded, operative interference may be ignored; indeed, a little pneumothorax may be a good thing, giving rest to the affected lung; but if breathing be difficult and the organs displaced, an external opening must be made. Rose reports striking improvement in eight cases of phthisis in which rib resection was practised. He holds that mere aspiration is of little value.

The pneumothorax in this case was severe, was unrelieved by repeated aspiration, and was finally overcome by the introduction of a tube into the chest. The subsequent history would seem to indicate that a free opening at first would have relieved the pressure symptoms permanently, even though it did not permit the expansion of the collapsed lung, which might have been accomplished by respiratory exercises and mechanical means later, when the lung wound had closed. It would be a nice point in surgical judgment to determine just how soon measures for the re-expansion of the lung should be inaugurated. If adopted too early the rent in the lung would be sundered, and the very condition one sought to alleviate would be aggravated. If employed too late, the efforts would be futile, the lung being bound by firm adhesions, the vesicular walls coalesced, and new connective tissue permeating in every direction.

In case of stab wound of the chest, Dr. Hopkins resorted to an ingenious plan of expanding the lung and preventing the further entrance of air into the thorax. A small rubber tube was introduced into the pleural sac, the wound snugly sutured about it, and the joint made air-tight by rubber tissue and collodion. The air was then slowly exhausted and the tube occluded. In this case there was no leakage from the lung. In a persistent pul-

monary leak, however, each expiration lends a puff of air to the general distention, so that an external vent must be established and maintained, unless the lung wound be large and accessible, when it may be sutured, otherwise it must be left to itself, be hæmorrhage not imperative.

Once the pneumonic wound has healed, a total exclusion of the entrance of air through the operative wound should favor a more satisfactory result. Dr. Hopkins has suggested and used in a case of pyopneumothorax a glass tube containing in its outer end a puppet-valve which allows air and pus to escape during cough and deep inspiration, but precludes the entrance of any air from the exterior. The siphon apparatus, invented by a Buffalo dentist and described by Keen, might be employed in these cases if the joint between the skin and the tube be made air-tight. The principle is the same as that of the mercury pump.

The Fell O'Dwyer apparatus for artificial respiration has been suggested to anticipate and combat acute operative pneumothorax. It consists of an intubation set with attached bellows.

Dr. Harte said that he was inclined to think that greenstick fracture of the rib is of much more common occurrence, particularly in children, than is generally considered. He had seen cases where the side had been crushed in and had had an opportunity to examine the patients post-mortem where this condition of affairs was evident. He believed that many injuries to the ribs in children are of the greenstick variety. Yet all recognize how difficult it is to make a positive diagnosis in these cases, owing to the anatomical difficulties which exist and the surrounding of the injured rib by one above and below it, which naturally act as splints or supports; consequently, crepitus and preternatural mobility are impossible to determine. Fortunately, the treatment in all instances is the same, and as a rule the results are most satisfactory.

With regard to the pneumothorax very little has been written, and then the subject is usually dismissed by writers in a very few lines. On the other hand, he thought that pneumothorax is not a very serious condition. Air in the thorax at any time, as a rule, will soon disappear. This condition occurs very frequently in fracture of the ribs, and rarely gives a surgeon any concern. Many mechanical devices for the relief of pneumothorax he considered as nothing more than surgical toys and of no practical

advantage. Exhausting the air from the pleural cavity will not facilitate the closure of the wound in the pulmonary pleura. On the other hand, it really makes the conditions more favorable for the escape of air from the lung into the pleura, by reducing the air-pressure in the pleura and allowing the escape of air from the lung into the partial vacuum in the pleura, tending to keep up a constant flow of air at all times from the lung into the pleura. The experience of surgeons in empyemas, where a large opening has been made into the pleural cavity, has been usually most favorable, and the presence of air in the pleural cavity does not in any way militate against the lung's expanding. In cases where there is evidence of intrapleural pressure, he would advise opening the chest wall and treating it as though it were a case of empyema.

DR. LE CONTE said that he saw this case probably at its worst. The pressure from the pneumothorax was sufficient to push the heart over to the right side, so that the apex beat was almost in the region of the right nipple. When such a condition exists as a result of fluid in the pleural cavity, no one would hesitate to open the pleura and insert a drainage tube or resect a portion of rib. It is not the fluid but the pressure from the fluid that causes the alarming symptoms. If, therefore, air in the pleural sac causes alarming pressure symptoms, why should one not apply the same rule, *i.e.*, relieve the pressure and allow the lung to collapse by opening the pleura. As a result of the pneumothorax this child later developed a pyothorax, and it necessitated opening the pleura with drainage, and the moment the pleura was opened the child began to improve.

ACUTE CHOLECYSTITIS COMPLICATING TYPHOID FEVER.

DR. THOMAS R. NEILSON reported the case of a man, aged forty-two years, who, on the evening of May 14, the fifty-eighth day after admission with typhoid fever which had pursued a mild course, but had relapsed, and was then apparently proceeding to convalescence, complained of a sharp pain, which he located in the epigastric region, and which, he said, followed immediately after he had reached to a small table, close by the right side of his bed, for a glass of water. At the time when he complained first

of this pain, the temperature was $99^1/_5°$ F., the pulse 82, the respiration 20. The bowels had been freely moved that day, and the tongue was clean. The pain was considerably relieved by simple measures (soda mint, etc.). The next day, however, the pain was still present, although not severe, being referred to the same region, and there was no change in the pulse or temperature. By the morning of the following day the pain was somewhat more marked, the temperature was 100°, the pulse 96, respiration 24. Examination of the abdomen again failed to elicit any marked tenderness in any part of it. Through the day the pain continued, tending to be paroxysmal, and being referred, but quite indefinitely, to the right hypochondriac region, although the patient also complained of it at times in the lower portion of the abdomen. The evening temperature was $99^1/_5°$, the pulse-rate had increased to 104, and the respiration was the same as in the morning.

The next morning, May 17, the patient vomited what was evidently bile; the temperature rose to $102^3/_5°$, the pulse to 120, and the respiration to 28. The abdomen was slightly tympanitic, pain in the region before described persisted, and was intense at times, and on palpation he found some tenderness close to the costal border, in the region of the gall-bladder. There was nausea at intervals, and eructations, and considerable flatus passed by the bowel. The condition of the patient grew worse through the day, his temperature in the afternoon rising to $103^4/_5°$, and the pulse to 130, with poor volume. Pain was more severe and vomiting again occurred in the evening. The general condition was far from promising; nausea was unrelieved by treatment, and, besides that, hiccough was added to the already distressing state.

Early the following morning a chill occurred, and after that there was vomiting again. The temperature was then 103°, and by eight o'clock it was 104°. Examination of the abdomen revealed its condition to be as on the day previous,—slight distention, some tenderness in the region of the gall-bladder, but not of a marked degree. There was, in addition, some muscular rigidity in the right upper quadrant, and some elastic resistance near the costal margin at the ninth and tenth ribs could be detected. There was hyperleucocytosis, the count being 12,350. The patient was in a condition of extreme anxiety and depression, and although the outlook was not promising,—the temperature at noon being $103^2/_5°$ and the pulse 136,—operation was advised and

agreed to. Immediately, as soon as the necessary preparations could be made, the abdomen was opened.

On opening the peritoneum, the gall-bladder, the surface of which was dark-red and dull in appearance, presented in the wound. It was distended, and on breaking away numerous light and recent adhesions which had formed between it and the surrounding viscera—especially the transverse colon—it was found to be markedly lengthened upward and inward. When the gall-bladder was incised, there first flowed out a thin, watery mucus, then bile and mucus, and last of all a fluid more viscid and unmistakably pus. The walls of the gall-bladder were thickened, soft, and friable, and were deeply congested, bleeding easily when punctured and incised.

Evacuation having been accomplished, fresh iodoform gauze was substituted for that first packed around the gall-bladder, a rubber drainage tube inserted into the latter, and the margins of the opening made in the fundus were secured by silk stitches to the parietal peritoneum at the upper angle of the wound, which latter was, for the remainder of its extent, closed with silkworm-gut sutures. A copious dressing of sterile gauze was applied.

The patient bore the operation well, and was none the worse for the ether, which was most carefully given. There was little, if any, shock. The temperature fell to $100^{3}/_{5}°$ F., and three hours later to $99^{3}/_{5}°$, accompanied, however, by a fall in the pulse-rate from 138 to 124. By six in the evening the temperature rose again, reaching $102^{3}/_{5}°$, but after that it slowly fell, remaining for the greater part of the next forty-eight hours between 99° to 100°, the respiration ranging from 20 to 26, and the pulse from 122 to 140.

The patient experienced but little relief from the operation, —none besides freedom from the severe pain which he previously had. Hiccough and nausea, particularly the former, were most obstinate and became very distressing. The abdomen was not tender, save, of course, in the region of the wound, nor was it markedly distended; but the accumulation of gas in the intestines was an annoying feature. The bowels were moved with difficulty by means of calomel and enemata.

The patient got but little rest on account of the persistent hiccough, which yielded but for short intervals to varying medication. Vomiting occurred several times, but the patient was

able, for a considerable number of hours, to take small amounts of liquid nourishment. Rectal alimentation was, of course, resorted to in addition. From the wound there was a free discharge of bile, requiring many gauze pads to absorb it, besides the gentle changing of the dressing.

On the afternoon of May 20, the beginning of the third day after the operation, the patient vomited freely, and his condition became emphatically worse. Tympanitis increased, hiccough became more violent and constant, nausea more persistent, the temperature rose to $100^{3}/_{5}°$ F., the pulse grew weaker, although no more frequent, and a low delirium developed. In short, the picture of septic peritonitis was complete. Death occurred at 4.30 on the following morning.

Dr. Gibbon remarked that about a year ago he operated for empyema of the gall-bladder following typhoid fever. It was a young girl who had been in the wards of the Pennsylvania Hospital, suffering from a typical attack of typhoid fever. She had been at home for about ten days when she returned to the hospital, saying that she had been taken sick with a pain under her right costal border, and her mother the day before discovered a tumor in this position. She had some fever. The tumor was very easily outlined in the gall-bladder region, and there was very little rigidity of the abdominal muscles at the time. There was no general distention, but the symptoms were acute; the woman had fever, and the operation seemed to be urgent. When the abdomen was opened the gall-bladder came into view very much distended, and there was at first a copious discharge of mucus and then pus. This girl got well without any trouble. The sinus closed entirely. He looked up her history in the medical ward afterwards and found that several times during her typhoid fever she complained of pain in the region of the gall-bladder. Once or twice at night she was given morphine for this pain. Each time it went away, and the pain complained of on readmission was, the patient said, in the position and of the same character as that which she had when ill with typhoid fever.

Dr. Harte remarked that as a rule the operation for cholecystitis immediately following typhoid fever is not a favorable operation, as the patient's condition necessarily is always very much below par. He had had an opportunity to operate on two cases of cholecystitis following typhoid fever, but in both of these

instances the patient had quite thoroughly recovered from the typhoidal attack, and consequently was well able to withstand the result of the surgical operation. Both of these cases did perfectly well and made very satisfactory recoveries. Attention had been called to the fact that the first fluid to escape from the gall-bladder of Dr. Neilson's case was serous in nature. His experience is that that is nearly always the case in these conditions. The first fluid is usually serous in character, then sometimes serum stained with bile, and then, lastly, the pus is usually found down at the bottom of the gall-bladder, often accompanied with masses of calculi which it surrounds. This condition of affairs, of course, is entirely dependent on the effect of gravitation, and of course the relative positions will be influenced by the position the patient has assumed prior to the operation.

NEPHROLITHIASIS.

DR. JOHN B. DEAVER reported the case of a man, thirty-three years of age, who for two and a half years had complained of an aching pain in the back, which increased on motion, but was relieved by rest. The pain radiated from the anterior superior spine of the ilium, through the groin to the left testicle and across the back. The pain was intense at times. No tenderness over the region of the left kidney. Micturition was unattended by burning or pain except when a catheter was used. There was a time when the patient was compelled to rise two or more times at night to evacuate his bladder. When constipated, or when tympanitic distention existed, the pain was exaggerated. He never suffered from nausea or vomiting during the acute exacerbations. An X-ray taken a week before admission to the hospital revealed the presence of a stone in the left kidney, also a second shadow about which there was some doubt. July 19, 1899, a vertical incision about three inches long was made in the left loin over the kidney and the organ exposed. A stone was felt in pelvis of the kidney, a cyst containing blood was discovered in the upper part of the organ. The pelvis was incised and the stone removed. The cyst was evacuated, the two incisions closed with silk sutures. The wound was packed and allowed to heal by granulation. Cure resulted.

MOVABLE KIDNEY AND HYDRONEPHROSIS.

DR. DEAVER also reported the case of a woman, aged twenty-one years, who was first attacked with dull aching pain in the left loin in November, 1896, since which time she has had numerous attacks of this pain, at times associated with nausea and vomiting. Immediately following the attacks of pain blood would appear in the urine, but an X-ray examination was negative. December 14, 1899, a vertical incision, three inches long, was made in the loin over the left kidney. The perirenal fat was dissected away and the kidney exposed. On examination, the pelvis of the ureter and the first part of the ureter were found to be dilated to the size of a small lemon. There was no stone present. The dilated portion of the pelvis and of the ureter was incised in the long axis of the ureter and clear fluid evacuated. The surplus portion of ureter was cut away and the wound sutured. The kidney was explored for stone, but none found. The surface of the kidney was scarified and the organ anchored in the wound with gauze. The patient made a satisfactory recovery.

A second case of movable kidney was in the person of a man, aged twenty-four years, who, after convalescing from an operation for chronic appendicitis, returned to the hospital to obtain relief from pain in the left renal region from which he had suffered intermittently for several years. The patient can only recall the pain, and say that it was excruciating, and that it did not extend into the penis or along the course of the ureter.

The second severe attack of pain, referred to left renal region, occurred while the patient was convalescing from his operation for appendicitis, and had the characteristics of kidney colic; the pain was referred down the course of the ureter and into the testicle of the corresponding side. This attack was not accompanied by nausea or vomiting, nor was the urinary examination attended by any positive results. The pain persisted, and shortly after the onset urination was attended by pain. Urinary examination, also X-ray examination negative. A vertical incision of three inches was made in the loin, commencing at the border of the twelfth rib at the postaxillary line, on the left side, the perirenal fat was broken through, when it was discovered that the kidney held a lower plane than normal. The kidney was brought into the wound and explored with a negative result. The kidney

was anchored in the wound with gauze. The wound was packed with sterile gauze after the method of treating movable kidney. Recovery followed.

NEPHRECTOMY FOR HYDRONEPHROSIS.

DR. DEAVER further reported the case of a man, thirty-eight years of age, who from early boyhood had suffered from paroxysmal attacks of pain in the right side, referred along the right ureter. During these attacks had a desire to urinate immediately, the pain ceasing at the end of micturition. When surrounding circumstances prevented micturition, he would strike his right side sharply; this relieved the pain to some extent. These attacks would take place either several times a day, or at intervals of one or two months. The quantity of urine passed varied from one-half ounce to twenty ounces.

This condition continued until four years ago, when he noticed a swelling in the right loin of about the size of an apple, accompanied by a sharp pain. In three or four days the tumor partially disappeared. Then for several years the tumor slowly increased in size until again about the size when first noticed. One year ago he had an attack of jaundice lasting three or four months, and since this time the tumor has been growing rapidly until it occupies the right hypochondriac, the right lumbar, the right iliac, and the umbilical regions.

The urine was frequently examined and always pronounced normal. His appetite is always good; he has not lost weight.

A blood examination showed hæmoglobin, 65 per cent.; red corpuscles, 4,500,000; leucocytes, 4,000,000; so it was practically normal blood. Believing the kidney to be in the condition of a hydronephrosis, an operation was done by the extraperitoneal route. This operation was particularly easy, from the fact that it was a large cystic organ. The cyst was exposed and aspirated; that reduced it. There was one common cyst, consequently there was no trouble in evacuating, after which the remaining part of the operation was very simple. It was terminated by suturing the wound and anchoring the ureter, after tying the distal end. This patient has recovered without a bad symptom.

The specimen consists of a mass of tissue, kidney shaped, fifteen by six centimetres in size, which is attached to the walls of an apparent cyst. The walls of the cyst are about five milli-

metres thick and are in direct contact with the remains of the kidney proper.

The interior of the kidney is in direct communication with the cyst cavity and forms part of the side of the cyst. The interior of the kidney has practically disappeared, and the stroma has changed so as to form several incomplete compartments, all in contact with main cyst cavity and opening into it.

The walls of the kidney proper are ten millimetres thick.

MALPOSITION OF KIDNEY.

DR. JOHN H. GIBBON spoke of a case of malposition of the kidney which he had recently seen in the dissecting-room. The organ, which was of normal size, was more or less firmly attached in the left iliac fossa, receiving its blood supply by a very short vessel from the external iliac, and having a correspondingly short ureter. The fact that the kidney was fixed in this position, together with the length of the renal artery and the ureter, shows that the kidney had always occupied the iliac fossa; this anomaly suggests the necessity of always palpating the kidney before making an incision to reach it. One can readily imagine the varied complications of diagnosis which a diseased kidney so placed might give rise to, and such complications would be greatly increased if the right kidney should be so anomalously situated.

FIG. 1.

FIG. 2.

TRANSACTIONS OF THE PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, May 7, 1900.

The President, DE FOREST WILLARD, M.D., in the Chair.

I. AN IMPROVED BRACE FOR HEAD EXTENSION. II. A HARD RUBBER SPRING BRACE FOR LATERAL CURVATURE.

BY JOSEPH M. SPELLISSY, M.D.,

SURGEON TO ST. JOSEPH'S AND THE METHODIST HOSPITALS; ASSISTANT SURGEON TO THE ORTHOPÆDIC HOSPITAL AND THE ORTHOPÆDIC DEPARTMENT OF THE UNIVERSITY HOSPITAL; SURGEON TO THE OUT-PATIENT DEPARTMENT OF THE PENNSYLVANIA HOSPITAL.

THE pieces of apparatus herewith described were devised during my service with Dr. Willard at the University Hospital. It is through his courtesy that they were made at the University Hospital machine shop.

I. BRACE FOR HEAD EXTENSION.

Theoretically, the ideal splint for a kyphotic tending spine is recumbency; but even cases that have enjoyed it with advantage must, finally, become ambulant with mechanical support, and this in highly located lesions must extend to the head. Next to recumbency, extension by suspension is most effective in combating a kyphotic tendency.

The jury-mast is an efficient exponent of the suspension principle, but patients complain that it is unsightly, and it permits lateral motion, which is sometimes undesirable.

The Taylor head-piece operative through extension by

means of a chin-cup is not sufficiently convenient in adjustment to insure modification daily, and the degree of extension obtained is far short of suspension.

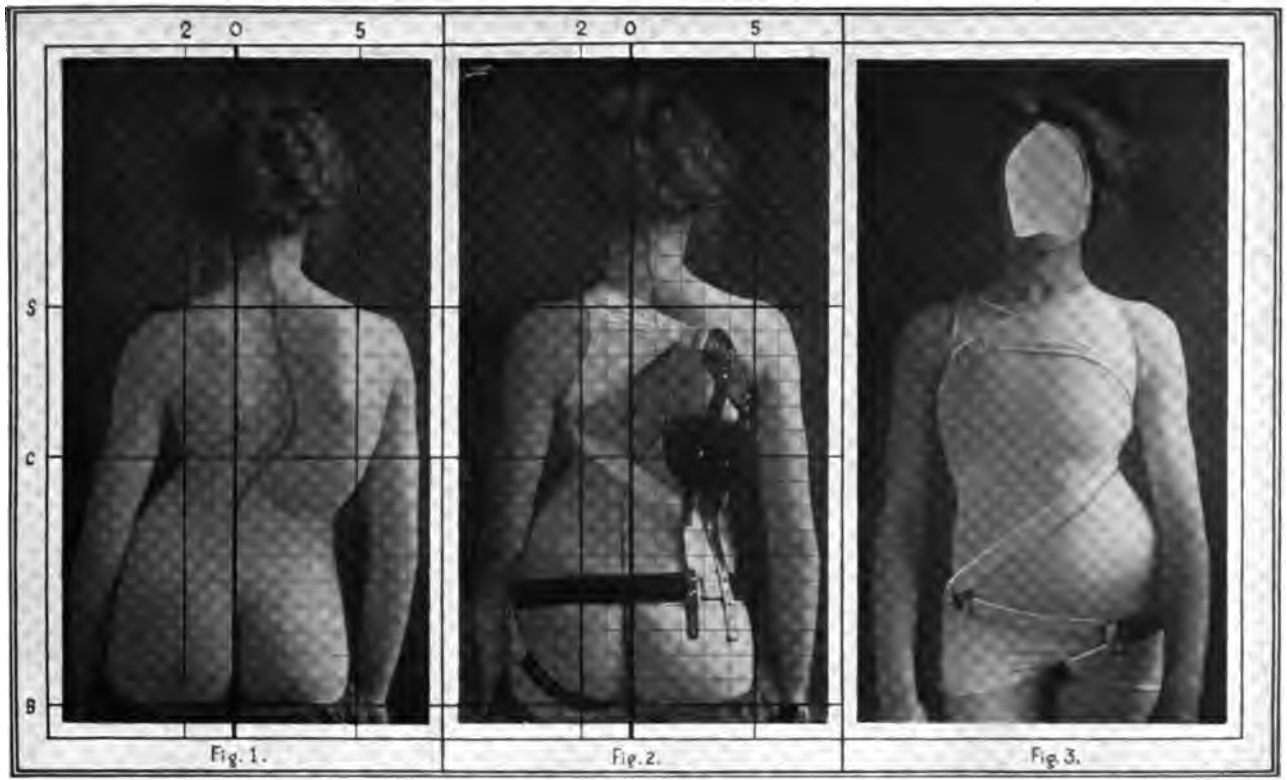
The Goldthwaite head-piece does not apply suspension or extension. It is a thorough posterior splint of the head and spine and it prevents lateral motion.

Suspension as complete as that of the jury-mast, but more controllable, convenient, and sightly, and also splinting as rigid as that of the Goldthwaite apparatus, is obtained in the adaptation of jury-mast and Taylor and Goldthwaite head-pieces described and illustrated below. (See Figs. 1 and 2.)

A keeper and a sliding-bar fastened by a set-screw similar to the device for the adjustment of the Taylor chin-cup are fastened at the top of the uprights of a Taylor spine-brace. The sliding-bar, however, instead of supporting a chin-cup, bifurcates at the occiput into two padded uprights, against which the head may be strapped by a webbing band passing round the brow and fastened by a buckle on each upright as in the Goldthwaite head-piece; but the uprights now take on the character of a double jury-mast. They turn at right angles and go horizontally forward, not above the head but loosely round it, on a level with the angle of the parietal bone, and they stop a little in advance of a vertical line through the anterior margin of the ear. These horizontal extensions of the uprights each have two buckles, which receive the webbing straps of an ordinary leather suspension-bridle or head-piece.

The brace is fixed below by the pelvic band, which grips the hips below the anterior superior iliac spines. Therefore, when the webbing straps of the head-piece are tightened, extension is applied to the spine between the pelvis and the chin and occiput. This extension is by suspension, and its degree is necessarily adjusted to the patient's need, at least, each time the brace is applied. Although webbing wears out more rapidly, it is preferable to straps with punched buckle-holes because permitting more perfectly graduated adjustment.

The webbing band round the brow—to limit lateral motion—should be adjusted last, otherwise it would interfere with the adjustment for extension.



FIGS. 1, 2, 3.—Photographs of a case of lateral curvature wearing (Figs. 2, 3) the hard rubber brace. The photographs were taken at the same distance and focus and at one standing. In Figs. 1, 2, the line O is the normal vertical median line, and it cuts the lowest point in the internatal crease, the base line B cuts the lowest border of the right gluteal crease. The degree of lateral correction effected by the brace is most easily appreciated by contrasting in Figs. 1, 2 the parts cut by lines 2, 5. The spinal curve is seen to be reduced by a little more than one-fifth, the deformity of the right lateral border of the chest by three-fourths, while that of the left side is only improved one-eighth. The gain in stature may be noted by observing the parts cut by the lines C and S.

This brace head extension was devised by me two years ago, and I have found it satisfactory for cases of cervical and high dorsal Pott's disease.

Dr. G. G. Davis, I have recently discovered, reported some five years ago a somewhat similar device, to which mine may be a duplicate, although independently conceived.

II. Hard Rubber Spring Brace for Lateral Curvature.

Cases of lateral curvature may be roughly divided into those treated by exercises alone and those treated by exercises and a brace. The brace is used in some cases as a reminder for patients who habitually revert to a vicious posture as soon as they escape from supervision, and braces are employed for others because the degree of deformity is gross.

The brace I exhibit is designed for the first class of cases. It was suggested by the spring bow-leg brace. A pad is placed over the deformity and is fastened to two convexly bent springs. When the ends of the springs are brought close to the body, considerable pressure is made on the deformity. A pelvic band and perineal strap hold the spring fast below, the pad is applied to the posterior deformity, and the upper end of the double spring is buckled in place by a strap passing round the opposite shoulder and side of the neck. As is seen (Fig. 2), considerable correction is effected in this way, and an indolent or forgetful patient is kept straighter.

[The brace is made of 18 gauge (about $^1/_{16}$ in.) untempered sheet steel coated with hard rubber. The spring characteristic depends entirely upon the rubber coating. By gently heating over a gas jet, the springs may be bent so as to make them stronger or weaker as occasion requires. The cleanliness, durability, freedom from rust, and the adjustability of the hard rubber truss, suggested the use of the same material for the brace now described.]

CASES OF COMPOUND OR COMPLICATED FRACTURE ILLUSTRATING THE VALUE OF OPERATIVE INTERFERENCE IN THE TREATMENT OF THESE INJURIES.

By HENRY R. WHARTON, M.D.,

SURGEON TO THE PRESBYTERIAN AND CHILDREN'S HOSPITALS; CLINICAL PROFESSOR OF SURGERY IN THE WOMAN'S MEDICAL COLLEGE.

Compound Dislocation and Fracture of the Lower End of the Tibia, with Fracture of the Fibula.—M. L., aged forty-five years, while standing upon the step of a shifting engine, was thrown off and struck the track violently, his weight coming upon the right foot, producing a fracture of the internal malleolus, with a compound inward dislocation of the tibia at the ankle, and a fracture of the fibula about two inches above its lower extremity.

He was brought to the Presbyterian Hospital, and I examined him soon after his admission, when I found the lower end of the tibia protruding from a ragged wound in the skin at the inner side of the ankle; the internal malleolus was separated and broken into several fragments, and was still attached to the internal lateral ligament. The astragalus was not fractured. The posterior tibial artery and vein were not injured. The wound was slightly enlarged to obtain a clear view of the parts. In view of the good circulation in the foot, I decided to resect the lower end of the tibia and a portion of the astragalus. About an inch and a half of the tibia and a portion of the astragalus were removed. The fibula was not resected, as it was found possible to bring the foot into its normal position in regard to the leg, the oblique fragments of the fibula slipping by each other, thus producing a compensating shortening. All loose fragments of bone were removed, the wound was irrigated with bichloride solution, a large drainage tube was introduced, the wound was partially closed by sutures, and a copious gauze dressing was

applied. The limb was next placed in a posterior binder's-board gutter splint, which was secured by a bandage, and for additional security was placed in a fracture-box. The wound was dressed on the fourth day and was found to be in good condition, and a plaster-of-Paris bandage was applied and trapped over the region of the wound. The patient did well after the operation, but healing was somewhat slow, as the wound was primarily infected and did not run an aseptic course. At the end of six weeks the patient was able to go about on crutches, and in a few months was able to walk upon the limb with comfort. The patient now has resumed his work as a switchman, and walks without a limp, and has good motion in the injured ankle.

This case represents a class of cases which many of us can remember as most unfortunate ones, before the modern methods of wound treatment had been adopted. It was formerly the rule in these cases to subject such cases to immediate amputation, for experience had proved that a more conservative method of treatment was usually followed by diffused abscess, septicæmia, spreading gangrene, pyæmia, and death; and only in exceptional cases was secondary amputation of the limb at a higher point able to save the life of the patient.

Compound Comminuted Fracture of the Tibia and Fibula.— X., aged fifty years, was admitted to the Presbyterian Hospital suffering from a compound fracture of the tibia and fibula caused by the kick of a horse. I saw this patient shortly after his admission, and upon examination of the injured limb was struck by the great amount of shortening and the great increase in the circumference of the limb in the region of the injury. There was a ragged wound over the front of the leg about midway between the knee and ankle.

The patient was etherized, and after the leg had been shaved and sterilized as far as possible, the wound was enlarged upward and downward in the line of the tibia, and it was then found that a fragment of the tibia, about three inches in length, occupied a transverse position between the ends of the fractured bone, its only attachment to the living tissues being by muscular fibres of the flexor longus digitorum and the interosseous membrane. There were also present in the wound a number of good-

sized separated fragments of bone. The fibula was also fractured near the seat of the tibial fracture. The anterior and posterior tibial arteries were found on examination to pulsate freely at the ankle. The vascular supply of the limb below being unimpaired, I decided to fix the upper and lower fragments to the large bone fragment of the tibia, and thus diminish the extensive shortening which would follow its removal, and make an attempt to save the limb. By making extension and by manipulation at the same time, I was able to fit the separated fragment between the separated ends of the tibia. I next removed a number of completely detached fragments. The large fragment was next fixed in position by a strip of perforated silver plate, secured by silver screws to the upper, lower, and intermediate fragments. When fixation was secured in this manner, it was found that the fragments of the fibula were in good position, so that no attempt was made to fix them. Several drainage tubes were introduced, and the wound was partially closed by sutures. A copious sterilized gauze dressing was applied and the limb was put up in binder's-board splints and placed in a fracture-box. The latter splints were changed in a few days, and a fenestrated plaster-of-Paris splint was applied. The patient did well, although there was some suppuration in the wound, and finally recovered with a useful limb, with a very moderate amount of shortening.

The result in this case was satisfactory to me, as in my experience it was the largest semidetached fragment which I have ever seen fixed to surrounding fragments and retain its vitality. Examination of this patient some months after he had left the hospital showed that union was only moderately firm between the upper end of the tibia and the detached fragment, and the patient was still using crutches. The application of a brace will permit the patient to use the limb, and will at the same time probably strengthen the union at this point.

Fracture of the Fibula with Marked Displacement of the Lower Fragment.—R., aged twenty-three years, while riding a bicycle, was struck by the fender of a trolley-car and sustained a fracture of the left fibula, about two and a half inches above its lower extremity, and a fracture of the internal malleolus of the tibia, with great contusion of the soft parts. I saw the patient,

with Dr. Hermann Allyn, on the day after the injury, and found the above-described injuries. The limb had been placed in a fracture-box, and the fragments seemed to be in good position.

Ten days after the injury, when the swelling had somewhat subsided, Dr. Allyn notified me that there was a marked deformity in the region of the fibular fracture, and I again saw the case with him. On examination, I found that the upper end of the lower fragment of the fibula projected upward, well above the lower end of the upper fragment; and although it was possible to partially reduce the deformity by manipulation, as soon as the reducing force was removed the deformity recurred. Finding it impossible to permanently correct the deformity, I advised that the fracture be exposed, and that the fragments be fixed in their proper position by a silver-wire suture or silver plate.

The patient was etherized, and an incision was made over the seat of the fracture. Upon exposing it, a strip of muscular tissue, probably from the peroneus tertius, was found between the ends of the fragments; this was displaced, and the ends of the upper and lower fragments were drilled, and a heavy silver-wire suture was introduced and secured, holding the fragments in good position. The wound was closed without drainage and a gauze dressing was applied, and the limb was put up in moulded binder's-board splints; these were taken off in ten days, and the superficial sutures were removed, as the wound was healed. A plaster-of-Paris bandage, including the foot and leg, was then applied, and this was removed at the end of six weeks, as firm union was present at the seat of fracture.

In a large number of fractures of the fibula which have come under my observation, I have never before seen a similar deformity, and from the conditions found to exist at the seat of fracture it is not possible that the deformity could have been remedied or satisfactory union could have occurred other than by operative interference.

Fracture of the Lower End of the Fibula with Fracture of the Internal Malleolus of the Tibia, with Marked and Persistent Deformity.—J. G., aged fifty years, received a fall in stepping from the pavement to the street and sustained a fracture of the right fibula about two and a half inches above its lower extremity,

and at the same time a fracture of the internal malleolus of the tibia. He was seen a short time after the accident by Dr. William E. Hughes, who asked me to see the case with him. Upon examination, we found the fractures above described, and at the same time there was such marked eversion of the foot that the edge of the tibia seemed about to protrude through the skin. The foot was also very much flexed by the action of the muscles inserted into the os calcis through the tendo-Achillis. All attempts to reduce the deformity were unavailing, so that an anæsthetic was employed; the reduction was then accomplished, and the limb was put up in binder's-board splints. At the next dressing of the case it was found that as soon as the splints were removed the deformity immediately recurred in as marked a degree as before, and could not be reduced until an anæsthetic was given. The greater the force employed to correct the deformity the greater was the muscular resistance offered.

As the deformity seemed to be largely maintained by the muscular force exercised through the muscles inserted into the os calcis through the tendo-Achillis, I decided to do a tenotomy of the tendo-Achillis, and then, having corrected the deformity, apply a plaster-of-Paris bandage. The patient was etherized, the tendo-Achillis was divided subcutaneously, and the deformity was then reduced without difficulty. The malleolus was well padded with cotton, and the foot was held in a position of over-correction while a plaster-of-Paris bandage was applied. This bandage was retained for four weeks and was then removed, and the fragments were found to be united in good position; a light plaster bandage was then applied and worn for a few weeks longer, and when this was removed the patient was allowed to use the limb in walking, and the result was entirely satisfactory.

I have resorted to tenotomy of the tendo-Achillis in several cases of fracture of the tibia and fibula occurring in the lower parts of the leg, where it was found impossible to correct an anterior displacement of the upper end of the lower fragment of the tibia by other means; but this is the first case of Pott's fracture in which I have found it necessary to resort to this procedure to obtain a satisfactory correction of the deformity.

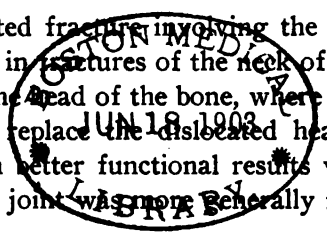
Comminuted Fracture of the Upper Extremity of the Humerus; Excision of the Shoulder-Joint with a Useful Arm.— J. B., aged fifty-five years, was admitted to the Presbyterian Hospital, having received a fall from a cherry-tree, striking the ground with his right shoulder. Upon examination of the right shoulder shortly after his admission to the hospital, I found great swelling of the soft parts in the region of the right shoulder, and a comminuted fracture involving the humerus in the region of the shoulder-joint; the shaft of the humerus was drawn upward, and apparently was completely separated from the head of the bone, and one sharp edge of the humerus had perforated the deltoid muscle and could be felt projecting almost through the skin. It was found impossible to reduce this deformity without the aid of an anæsthetic; this was given, and the deformity was reduced, and the arm was put up in a Ferguson dressing. The next day, upon removing the dressing, it was found that the deformity had recurred, and that the skin was in great danger of perforation by the sharp end of the lower fragment of the humerus.

Dr. Willard saw the patient with me, and we decided that it would be wise to cut down upon the fracture and fix the fragments by sutures if possible, to prevent a recurrence of the deformity. I explained to the patient that, if it was found impossible to fix the fragments by sutures, his best chance of a useful arm would follow an excision of the head of the bone, and obtained his consent to do what we considered best at the time.

The patient was etherized, and the seat of the fracture was exposed by an incision; it was found that there was marked comminution of the upper extremity of the humerus, which also extended to the head of the bone, so that it was impossible to fix the shaft of the humerus to the head of the bone by sutures. This condition existing, I proceeded to excise the head of the bone, and also resected a portion of the end of the shaft of the humerus, so as to furnish a smooth surface to articulate with the glenoid cavity. The wound was drained and closed by sutures, and a copious gauze dressing was applied; a wedge-shaped pad of sterilized cotton was placed between the arm and body, with the base of the wedge at the elbow, so as to bring the end of the humerus as nearly as possible in relation with the glenoid cavity.

The arm was then fastened to the side of the body by the turns of a bandage.

The wound ran a perfectly aseptic course and was firmly healed in a few weeks; the patient did well except for an attack of pneumonia, which prevented his leaving his bed for some weeks. When he recovered from this attack, he was allowed to go about with his arm in a sling, and was encouraged to use it as much as possible. When last seen, some months after the accident, he had good use of the arm.



In comminuted fracture involving the neck and shaft of the humerus, and in fractures of the neck of the humerus with displacement of the head of the bone, where it is often difficult or impossible to replace the dislocated head of the bone, I believe that much better functional results would be obtained if excision of the joint was more generally resorted to.

Extensive Gunshot Wound of the Shoulder-Joint; Excision of the Joint, with Recovery with a Useful Arm.—C. E., aged sixteen years, was admitted to the Bryn Mawr Hospital in December, 1899, having received an extensive gunshot injury of the left shoulder. In climbing a fence with a gun in his hand the weapon was discharged, and the charge of No. 7 shot entered the tissues just above the anterior fold of the axilla, passed backward and upward, and emerged just above the spine of the scapula. Upon examination of the patient I found an oval lacerated wound just above the anterior edge of the axilla, and upon passing my finger into the wound I discovered that the upper part of the shaft and head of the humerus were extensively comminuted, and also that the acromion process was separated from the scapula; the deltoid muscle was extensively lacerated, the axillary vessels were uninjured, and the circulation in the arm and forearm was unimpaired. In view of the non-involvement of the blood-vessels in the injury, I decided to remove the comminuted fragments of bone, resect the end of the shaft of the humerus, and excise the head of the humerus.

The patient was etherized, and the anterior and posterior wounds were enlarged by incision, and a number of loose fragments of bone were removed; a portion of the head of the humerus which still remained in the glenoid cavity was also removed.

The upper end of the shaft of the humerus was turned out of the wound and sawn off, so as to give a smooth surface for articulation with the glenoid cavity. The separated acromion process was fastened to the scapula by a heavy wire suture. A large drainage tube was passed through the anterior wound and brought out of the posterior one, and some sterilized gauze packing was also introduced to control the venous hæmorrhage, which was quite free. The anterior wound was next partially closed by sutures and a copious gauze dressing was applied; a wedge-shaped pad of sterilized cotton was placed between the arm and the body, with the base of the wedge at the elbow, and the arm was then securely fastened to the side.

The subsequent history of the case was uneventful, and the patient was discharged from the hospital with fair motion of the arm at the shoulder.

Dr. Branson, who had charge of the patient after the operation, states that he has seen him recently, and that the result is an excellent one.

Examination of the injured arm five months after the injury shows that the wounds are healed, and that the patient has free motion at the shoulder-joint; the most marked disability being shown in lifting the arm, which is accounted for by the great wasting of the deltoid muscle; this condition is probably largely due to destruction of the muscle itself as well as to the injury of the circumflex artery and nerve at the time of the accident.

DISCUSSION.

Dr. Huntington, of San Francisco, said that through the kindness of Colonel Girard, Chief Surgeon at the United States General Hospital at San Francisco, he had been able to inspect a large number of gunshot fractures, and had been deeply impressed by this consideration,—that a very considerable amount of loss of tissue may be sustained without succeeding material deformity after repair has taken place, or, in other words, a large amount of interspace may be expected to be filled in efficiently during the process of repair. He recalled one case in which a Mauser bullet carried away nearly one-half of the femur for a distance of two and one-half inches, fracturing the bone completely. The remaining portion of the bone was comminuted, so

it was doubtful if there were more than two-fifths of the circumference of the femur which were brought into apposition with its opposing fragment. In that case the result, after some four months, was almost perfect.

Dr. James E. Moore, of Minneapolis, said that plaster of Paris was in great favor with the Western surgeons as a fixation agent. Where the patient is under the immediate control of the surgeon the plaster of Paris is not infrequently applied at once. Where he is not under immediate control, or where he is not seen immediately after the accident and until after swelling has taken place, he is cared for very much as he had seen them cared for in the hospitals in Philadelphia, until the swelling has gone down, then the plaster-of-Paris dressing is applied. There is no question but that the operative treatment in many cases of fracture is the only proper treatment. One of his colleagues at the present time was making a series of experiments bearing upon the possibility of injury to the nerve supply of some of the long bones as a causative factor in non-union or delayed union. His experiments, however, are not yet complete, although he has given verbally some very strong evidence pointing towards that as a cause for non-union.

Dr. Wharton remarked, with reference to the case of comminuted fracture in which a large fragment had been retained, that in many cases of comminuted fragments he would have removed them all and have gotten marked shortening, but here, where he had one large fragment, he thought he could reduce the shortening by wiring, and he felt justified in making the attempt. He thought that in this case he would eventually get a useful limb by having a plaster-of-Paris bandage put on, and allowing him to go around as they do in the ambulant treatment; that is, by walking in the plaster bandage, or by having the brace adapted so that a certain amount of weight can be brought to bear on the limb and a certain amount taken off the limb at the seat of fracture by means of the brace.

With regard to the method of fixation in compound fractures, he was not at all wedded to the silver plate. In the larger number of compound fractures in which he secured fixation by suture, it was by means of heavy silver wire. By applying more than one heavy silver-wire suture one can get as good fixation as by the silver plate. In using the plate, the screws, unless very carefully

made, are apt to have the heads turn off or split. A mistake in using the silver wire is in not using it heavy enough in order to stand a certain amount of strain.

With regard to the question of compound fractures involving the joints, he agreed with Dr. Allis that in a majority of cases the functional result would be better if operative methods were adopted. He was not able to agree with him as to the advisability of operating in patients suffering from intracapsular fractures of the femur, for such operations would be followed by a very heavy mortality; but in younger patients, and in some other joints, operation would be followed by much better results as regards the function of the limb.

INSTRUMENT FOR FACILITATING THE ANASTOMOSIS OF HOLLOW VISCERA.

DR. M. O'HARA, JR., presented a new forceps for use in intestinal anastomosis, describing them and their use in a paper.

A METHOD OF PERFORMING ANASTOMOSIS OF HOLLOW VISCERA BY A NEW INSTRUMENT.

By M. O'HARA, Jr., M.D.,

GYNÆCOLOGIST TO ST. AGNES HOSPITAL; ASSISTANT SURGEON TO GYNECEAN HOSPITAL, AND CHIEF OF SURGICAL CLINIC AT THE MEDICO-CHIRURGICAL HOSPITAL.

A THOROUGH appreciation of the responsibility one takes upon himself when he offers something that differs from the procedures that are in vogue, has prompted me to use every endeavor to find wherein this instrument which I present was weak. I am pleased to state to you, however, that if an error exists in its application I have been unable to find it. I have met with results of the most satisfying character in all of my experimental work on the lower animals. Basing my assumption upon the knowledge thus obtained, I unhesitatingly offer these forceps to the profession, confidently feeling that, if the forceps are used as they should be, they will win the same confidence in the hands of others that they have in mine.

My experimental work has gone on for the past nine months, and I can state that I have found the forceps in their application to possess advantages not to be found in any of the methods now in use. To briefly mention some of these advantages: First of all is the wide application of a single instrument: with the same instrument one may do a resection of the pylorus, of the cæcum, and of the small or large intestines. Anastomosis can also be performed on any of the hollow viscera, including the large and small intestines, stomach, and even intestines of unequal calibre; the various gall-bladder operations can also be performed. In fact, I cannot conceive any of the gastro-intestinal operations that cannot be performed by the use of this instrument.

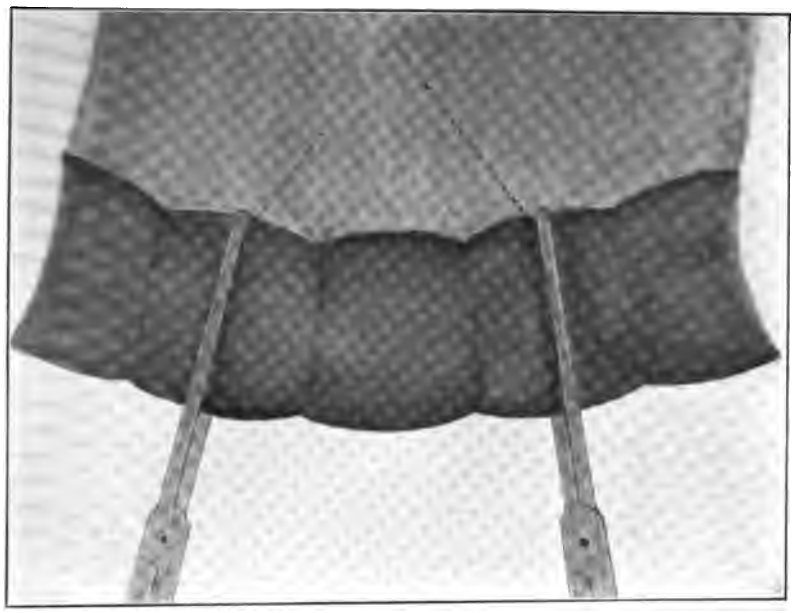


FIG. 1.—Showing the manner of placing forceps in resection of bowel; dotted lines show the incision to be made.

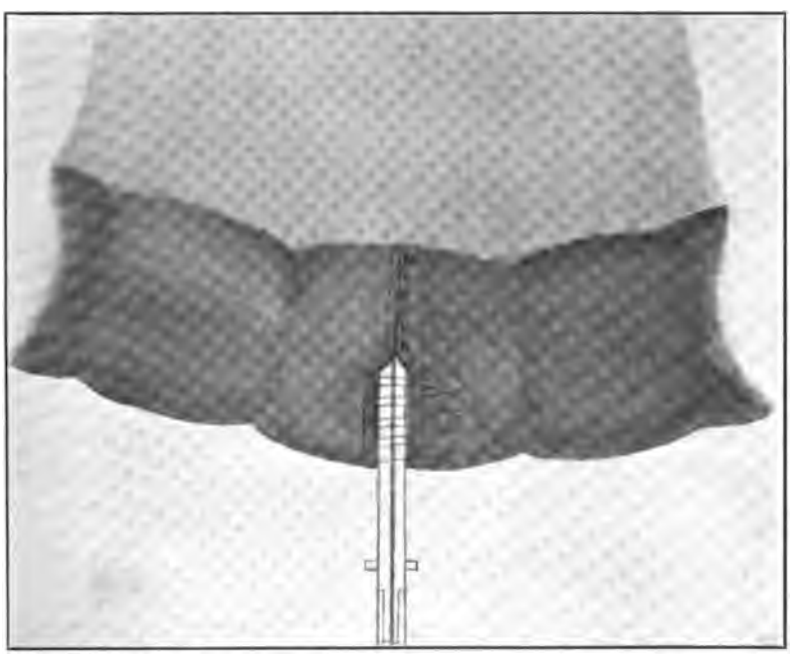


FIG. 2.—End-to-end anastomosis. Forceps brought together and held by serre-fine (not shown); sutures introduced, some of which are tied.

An exceedingly strong factor in favor of the forceps and method is the manner of closing off the bowel cavity at once; this is the first step in all operations where the forceps are employed, the bowel remaining closed until the very last moment; when the forceps are removed it is through a very small opening, an opening so small that it is under the thorough control of the operator; thus the dangers of fecal matter escaping into the peritoneal cavity are prevented.

Rapidity is an essential factor, where such rapidity does not sacrifice careful and accurate work. A method the speed of which is not at the expense of accuracy, is the only method one can consistently use in gastro-intestinal surgery, and it pleases me to say to you that the speed of my method has not been at the expense of accurate work.

In comparing this method with the Murphy button operation, it may take a moment or so longer; but I think the extra time spent in forceps approximation of the bowel is well spent when one considers the very decided advantages gained. It is certainly more surgically complete than leaving a foreign body in the intestinal canal, which causes no little anxiety until the patient has voided it.

Secondary stricture of the bowel is another important matter for consideration in this class of work. The dangers of this complication are reduced to the minimum in the method under discussion.

The calibre of the bowel is not impaired in the least degree, as the bowel is spread out to its fullest extent, without stretching, by the forceps before sutures are introduced. As to the amount of gut inverted, this, I think, causes no difficulty if it be within reasonable bounds, as in a very short time it undergoes an atrophy; in fact, in my dog work, I was surprised to find that this atrophy occurred in several cases to such an extent that in a week's time one could hardly find any trace of the gut that was inverted. In these cases I turned in about a half an inch, which was more than was required, and on examination a week later I could only find about a sixteenth of an inch projecting into the lumen of the gut.

I need not dwell upon the necessity for accurate suturing to obtain successful results in all bowel work. In comparing this method with some of the other artificial means to assist in suturing accurately, such as the inflatable rubber bags, all that is needed is for one to see the forceps used to be convinced of their superiority. A test that I have employed to satisfy myself of the accuracy of my suturing has been to tie one end of the sutured gut, place the other end on a faucet and turn the water on; if I had used ordinary care, no leakage would occur at the line of suturing, the stitches tearing out before any leakage would occur. This procedure is about as severe a test as one could employ, certainly in the human subject the strain is never so great as this.

To summarize the points of advantage claimed for this method:

(1) Reduction of the dangers of sepsis.
(2) Rapidity.
(3) Accuracy.
(4) Wide range of application.
(5) Simplicity.

These I would term the cardinal points to success in gastro-intestinal surgery as well as in gall-bladder surgery.

The instrument consists of two pairs of straight forceps, the jaws of which are very slender and two and a half inches long, for ordinary work; for special work they can be made longer. Instead of being roughened as in the ordinary hæmostatic forceps, they are grooved down the centre of one blade; the opposite one has a ridge, similar to a pile clamp; both forceps are held together by means of an adaptation of the serre-fine.

Method of doing a Resection, followed by an End-to-end Anastomosis.—The serre-fine clamp is removed, and one forceps is placed transversely across the bowel at the point selected to mark the upper border of the resection, and locked; the other forceps is placed in the same manner at the lower margin of the resection. The tips of each forceps should be on an exact line with the mesenteric attachment. Forceps are placed

FIG. 3.—Lateral anastomosis. Forceps applied in a line with the long axis of the gut.

upon the ends of the intervening portion of the intestines, to prevent any leakage from this source. Then with a pair of curved scissors or a scalpel cut the bowel rather close to the forceps, the incision being carried into the mesentery so as to remove a wedge-shaped piece, avoiding the wounding of any important vessels; if bleeding occur from any of the smaller vessels, a clamp can be placed on it temporarily.

The two forceps are then brought and held together by means of the serre-fine clamp, the sutures are then introduced, starting at the point nearest the lock of the forceps and carrying them down to the tips, where a little care should be exercised to get accurate apposition of the gut at its mesenteric attachment. I have found it necessary at times, where the mesentery was quite dense and broadly attached, to nick it with a pair of scissors and push it back to allow the bowel to turn in properly. If an interrupted suture has been employed, it is now necessary to tie before proceeding to the other side. The forceps are now turned over and the sutures are placed in the same manner, only they are started from the tips of the forceps, and are carried up until the level of the first suture has been reached. The forceps are now unclamped; one pair removed by unlocking and drawing out in a straight line; the other is unlocked and passed above and below the line of suturing within the canal of the gut to insure that both walls of the gut have not been included in any of the sutures. They are then withdrawn and the remaining opening closed by one stitch. If the operator desires it, he can now run a row of sutures to reinforce the first. The incision remaining in the mesentery is closed in the usual manner.

Method of doing Lateral Anastomosis.—The gut is picked up by means of a rat-toothed forceps, and one pair of forceps is applied in a line with the long axis of the gut. The tip must be on an exact line with the edge of the gut; the forceps includes just so much of the gut as the size of the mouth one intends to make; the other forceps is placed in the same manner, at the point where it is intended to make the other mouth, using care to pick up the same amount as in the first forceps;

this can be done by observing the graduated lines that are on the forceps. Then with a pair of curved scissors cut fairly close to the forceps and remove the gut that projects beyond the forceps; the forceps are now brought together and held by the serre-fine clamp. The sutures are introduced from the lock to the tips in the usual manner, using a little extra care on reaching the tips. The sutures are now tied and the forceps turned over; sutures are placed on this aspect of the gut from the tips towards the lock to the level of the first suture. The sutures are now tied and the forceps unclamped, one being removed, the other being unlocked and passed to each side of the line of suturing, to make sure that both walls of the gut have not been included in any of the sutures. This forceps is now removed and the small opening closed by one suture, and if it is desired, another row of sutures can now be placed to reinforce the first.

The mouth made after this method is one that is made by the removal of an oval-shaped piece of tissue, thereby lessening the possibility of secondary contraction. As to the size of the mouth, this can be made as large as the fancy of the operator may dictate.

In dealing with the open ends of the bowel, as is the case at times after lateral anastomosis, one pair of forceps is all that is required. It is placed as in the end-to-end operation and the bowel turned in upon itself and serous membrane stitched to serous membrane. This method is almost identical with that followed by Dr. Ernest Laplace, except that I place the tip of the forceps on a level with the mesenteric attachment; by so doing it is only necessary to place one stitch when the forceps is removed.

The forceps can be used to anastomose bowels of unequal calibre, as is the case in resecting the cæcum; by placing the forceps upon the large gut at the point it is desired to resect and on a corresponding point of the small gut, using care to place the forceps in such a manner that it corresponds to the point of desired entrance into the large gut; the forceps are then clamped together and the sutures passed from the small

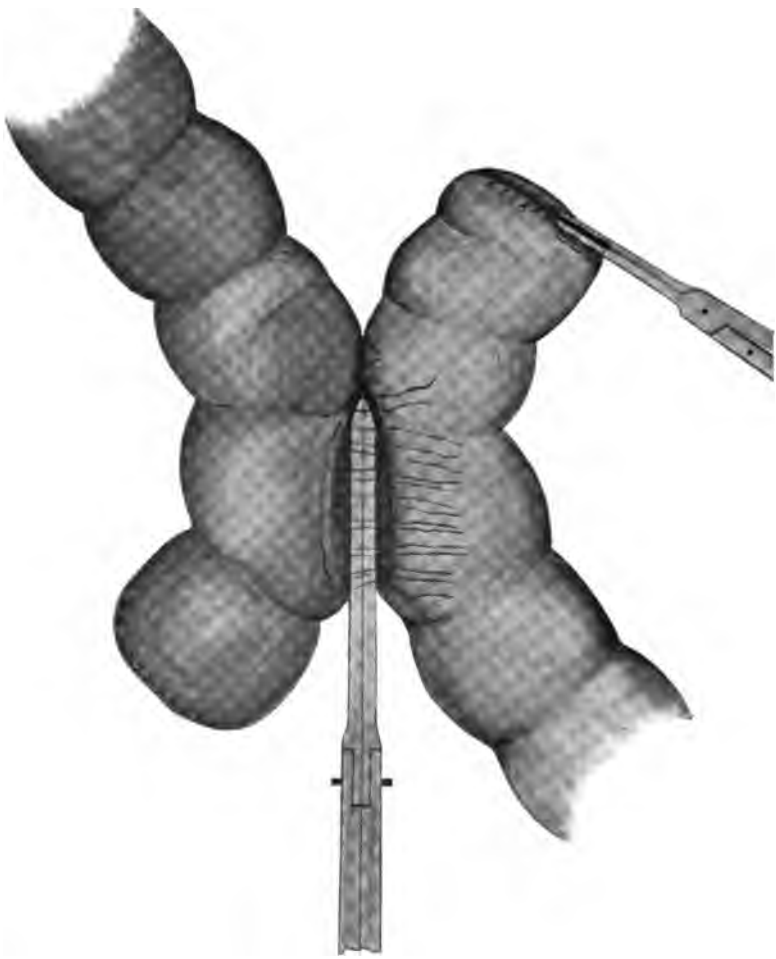


FIG. 4.—Lateral anastomosis. Shows forceps brought together and held by serre-fine (not shown); sutures introduced, some of which are tied. Also shows manner of placing forceps in invagination with sutures applied, some of which are tied.

to the large gut, and so continued until the small and large gut have been sutured on each side, when the forceps holding the smaller gut is removed. A suture is now placed with a little care to close that point where the small joins the large gut. The large gut is now sutured upon itself, as in the method of invagination. When all the sutures are in place and have been tied, the forceps are passed above and below the line of suturing of the small bowel, to be quite sure that the sutures have not included both walls of the gut; the small opening that remains is now closed, and if it is desired another row of sutures can now be placed to reinforce the first. The above method can also be applied to resection of the pylorus with little or no modification.

A practical point to which I might call attention is, that one should bear in mind, in placing the forceps, to place them in such a manner that they can be turned over readily without putting any traction on the gut.

In closing, I wish to thank Dr. H. D. Beyea for his assistance in helping me with illustrating the text. I wish also to acknowledge the debt of gratitude I owe Dr. Alfred Stengel for extending me the use of the Pepper Laboratory, where every facility was given me for carrying on my experimental work.

DISCUSSION.

DR. LE CONTE said that through the courtesy of Dr. O'Hara that day, he had used these forceps on a case of tubercular peritonitis which, after an operation a year ago, developed a fæcal fistula in the line of the incision. After freeing up the adhesions, he found the perforation in the bowel to be over two inches, necessitating a resection of the ileum. The rapidity and ease with which the forceps were used was surprising, and the time consumed in resecting the gut and making an end-to-end anastomosis was probably not over five or six minutes. He could fully bear out all the claims Dr. O'Hara made for the instrument, and he called attention particularly to the simplicity of the forceps, their easy application, and the impossibility of leakage while the anastomosis is being done.

DR. HUNTINGTON said that he would hesitate to make end-to-end anastomosis between the small and large bowel by attempting to close a portion of the large bowel and then attaching the small bowel to the resulting aperture. There is a fault in that procedure that does not, however, minimize the value of the instrument. He personally did not approve of the metallic button, and believed, if accurate statistics of the operations done by the Murphy button throughout this country to-day could be furnished, surgeons would have a list of tragedies that would be appalling. He had used it fourteen times, and if he included one which was reported six days after the performance of the operation, and since he left home, as being probably a success, he had but two successes to record.

DR. DAVIS remarked that the question of time in doing an anastomosis with this instrument as compared with that of the Murphy button had been raised. It seemed to him that it was perfectly easy to decide the relative time consumed by comparing the two procedures. In the first place, with the Murphy button, it is required to place the two ends in place and fix each with a purse-string suture. That would take probably longer than the clamping of these two forceps to the gut. In the second place, the Murphy button is usually reinforced by Lembert's sutures around the button. If that is done, then it is a question of surrounding the entire circumference of the gut by Lembert's sutures. That is all Dr. O'Hara does.

The gut being the same in both instances, the time consumed in applying the Lembert's sutures around the gut in both the Murphy button and these forceps would be approximately the same. Therefore, if the button was applied with a single row of sutures, and if Dr. O'Hara only used a single row of sutures in his operation, then it would appear that both operations could be done in the same time. In other words, it would take no longer to make the operation with Dr. O'Hara's forceps than it would take with the Murphy button reinforced with a single layer of Lembert's sutures.

TRANSACTIONS OF THE PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, June 4, 1900.

The President, DE FOREST WILLARD, M.D., in the Chair.

TUBERCULAR PERITONITIS; RECOVERY AFTER ABDOMINAL SECTION; FÆCAL FISTULA.

DR. ROBERT G. LE CONTE reported the following case: An Italian woman, aged seventeen, was admitted to the Pennsylvania Hospital on December 15, 1898. She had complained for more than two years of abdominal pain, associated with increasing fulness and swelling of the abdomen, and accompanied by general debility and anæmia. Family history negative, and her previous history negative, except that she had always been pale and sallow. The abdomen was large and tense and filled with fluid. The heart, lungs, and urine were negative to examination. Two days after admission the abdomen was tapped and ninety-four ounces of clear, straw-colored fluid withdrawn. Slowly and gradually the fluid reformed in the abdomen, so that by February 6, 1899, she was again greatly distended. She was again tapped, and 220 ounces of clear fluid withdrawn, of 1020 specific gravity, and containing a few leucocytes. A blood count at this time showed red corpuscles 5,600,000, white corpuscles 50,000, hæmoglobin, 60 per cent. By February 25 the abdomen was again considerably distended. The patient was etherized and the abdomen opened in the median line below the umbilicus. The peritoneum was much thickened, and an encysted cavity, extending from the umbilicus to the uterus, was opened. This contained fluid and cheesy material. The intestines were densely adherent around the cavity and covered with tubercular nodules. These adhesions were broken up, the abdomen was irrigated and closed with drainage. Two days later the drainage tube was removed. The drainage

tract persisted, discharging a small amount of pus, and on March 10 it was dilated and a considerable amount of pus and caseous material escaped. A drainage tube was then reinserted. Up to this time the patient had been steadily losing in weight, but now a slight improvement began, and she gained slowly. May 1 a blood count showed the red corpuscles 3,480,000, white corpuscles 8000, hæmoglobin, 60 per cent. The sinus still persisted and discharged pus. May 20 the discharge from the sinus became offensive, and on June 5 the discharge changed to dark-yellow fluid with a marked fæcal odor. June 8 a large round worm was passed from the sinus with some fæces. From June, 1899, to February, 1900, the patient remained in about the same condition, neither gaining nor losing much in weight. For the greater part of the time she was in bed, but some days she would be up in a wheel-chair. The sinus persisted, discharging from time to time small amounts of liquid fæces. At this time the patient came under Dr. Le Conte's care. Her weight was sixty-five and a half pounds and she was a most miserable-looking object. In a few days the sinus began to enlarge, and on February 10 something could be felt at the bottom. A pair of forceps was introduced and a piece of gauze about five feet long and a yard wide was removed. The large cavity that remained soon filled with fæces, and the entire intestinal contents were discharged through the abdominal wound, none being passed by rectum. As a result the skin about the wound soon excoriated, and her suffering from dermatitis was considerable. The patient's condition was such that operation was out of the question. The first week in March she passed some fæcal material by the rectum, which gradually increased in amount, although the larger part was still passed by the abdominal wound. Her condition then began to improve, and she commenced to gain in weight. May 4 the blood count was red corpuscles 4,880,800, white corpuscles 20,200, hæmoglobin, 57 per cent. May 7 the patient was etherized and the sinus was cleaned, curetted, and packed with sterile gauze. The skin of the abdomen, which was still excoriated, was then cleaned as thoroughly as possible, and an elliptical incision made, so as to include the sinus and all of the old scar-tissue. On reaching the transversalis fascia, dense, thick fibrous tissue was encountered, extending three inches or more to the right, and the same distance to the left of the median line. After considerable difficulty

this fibrous mass was separated from the abdominal wall. The condition present may perhaps best be described as follows: A cavity of irregular outline, varying from two to three inches in diameter, surrounded by thick, dense, almost cartilaginous, fibrous tissue, and communicating by a large opening with the small intestine. This fibrous sac was surrounded above, on each side, and behind by adherent bowel, in front by the abdominal wall, and below by the fundus of the uterus, and both tubes and ovaries. Except a small portion of the sigmoid flexure which was adherent on the left side, the remaining adherent bowel was all small intestine. These adhesions formed a series of loops in the small intestine varying from a few inches to perhaps a foot or more in length, simulating more or less a rosette formation. Where the bowel was sharply kinked or flexed in the short loops, these surfaces showed a few small tubercles, but for the rest the peritoneum was free from any evidence of tubercular disease. After freeing the sac from all adhesions, an undertaking which required considerable time, it was found necessary to remove both tubes, the left ovary, and part of the right. The opening into the small bowel was two and a half inches long by half an inch wide. The portion of bowel opposite the mesentery had simply disappeared, and a closure of the rent by suture was impossible. A resection of four inches of intestine was therefore done, with an end-to-end anastomosis. Dr. O'Hara's intestinal anastomosis forceps were used, and the time consumed in doing the resection was about five or six minutes. The abdominal cavity was then thoroughly wiped out and irrigated with hot salt solution, and as much of the solution as possible allowed to remain in. The abdominal wound was closed without drainage. Time of operation two hours and ten minutes. Although no blood had been lost, the patient was profoundly shocked, and two hours later the pulse was so weak and rapid it could not be counted. The median basilic vein was opened and three pints of normal salt solution thrown into the circulation. The pulse immediately became stronger and less rapid. From then on the convalescence was uneventful. The stitches were removed on the tenth day and the wound found perfectly healed, and on the twenty-first day the patient was out of bed. Her weight at present is seventy-seven pounds.

Dr. Le Conte called attention to the part taken by the gauze

sponge, left in the abdominal cavity, in the cure of the tubercular peritonitis. To his mind the necessary irritation of the peritoneum produced by the sponge was the important factor in the cure of the peritonitis, and while the gauze brought on a dreadful chain of evils, it in reality cured the patient.

DR. G. G. DAVIS said that he operated on a case a few months ago of tubercular peritonitis; the peritoneum was found to be studded with tubercles everywhere, and was full of purulent material. The abdomen was washed out with salt solution and the incision closed. The condition of the patient was a little improved, but he afterwards died. The idea of additional irritation by gauze strips is perhaps worthy of a trial. In other words, if one opens an abdomen affected with tubercular peritonitis instead of simply closing it—after washing it out—would it not be wiser to insert gauze in various directions through the incision and then remove these strips of gauze afterwards? It would probably set up this very inflammatory process, which, in this case, would prove a constructive instead of a destructive one.

THYROID CYST.

DR. ROBERT G. LE CONTE presented a man, aged twenty-seven years, who about four years ago noticed a slight swelling on the left side of the throat, which gradually increased in size until this winter, when the growth was very much accelerated. About that time—four or five months ago—he began to have some difficulty in respiration and considerable trouble the moment he laid down. He also had some slight difficulty in swallowing, and there was a slight huskiness of the voice. The growth was situated on the left side, extending from the hyoid bone to beneath the clavicle, and from a little beyond the median line to the outer border of the sternomastoid muscle. The skin over it was tense, but in no place adherent, and the growth felt cystic in character. He was admitted to the Pennsylvania Hospital on the 17th of May; he was etherized on the 19th, and Kocher's angular incision made. The superficial veins were tied, and the capsule of the gland was exposed. It was then found that the sternothyroid muscle had to be cut at its insertion into the thyroid, to deliver the tumor. The capsule was freed as far back as the inferior thyroid artery, the gland dislocated forward, incised, and the tumor enucleated. The wound was closed with-

out drainage. The stitches were removed on the eighth day, and the man has had a perfect recovery. The growth is a cyst.

PERFORATING GASTRIC ULCER SIMULATING APPENDICITIS.

DR. RICHARD H. HARTE reported the following case. A man, thirty-one years of age, was admitted to the Pennsylvania Hospital, stating that he was perfectly well up to the day before admission, when he was taken with sharp abdominal pains. There was no vomiting or diarrhœa. He was treated at home, but the pain became worse, so that the ambulance was sent for and he was taken to the hospital. When seen his temperature was slightly elevated, features pinched and anxious, tongue coated, and he complained greatly of abdominal pain. On examination, the abdomen was slightly distended, very hard, and there was a great deal of muscular rigidity and exceeding tenderness on slightest pressure. The point of tenderness was decidedly over the region of the appendix.

With this imperfectly elicited history, the diagnosis of perforated appendicitis was made and an operation advised immediately. In less than an hour from the time of his admission he was etherized and an incision made over the region of the appendix. Immediately on opening the peritoneal cavity there escaped a considerable amount of gas, together with considerable yellowish fluid containing flakes of organized lymph. There were no adhesions to speak of. The appendix was soon exposed and a small ulcerated portion at its extreme tip was found; otherwise it seemed fairly normal. It was ligated and excised, and the abdomen thoroughly flushed with hot normal salt solution and a two-way drainage tube introduced and the wound closed. During the operation the patient's condition was almost *in extremis*. The tube was flushed out frequently, and on the next day the patient expressed a certain amount of relief; the pain was greatly diminished; but he had frequent attacks of vomiting of dark-reddish material which unquestionably was blood. The diagnosis was then made of ruptured gastric ulcer, causing the peritonitis from which the patient was suffering rather than the primary trouble in the appendix. These symptoms lasted for the next forty-eight hours, when the abdomen became much distended, the pulse failed, and the patient died. A post-mortem

examination was made through the abdominal wound, and with difficulty the stomach was removed and several small ulcers were found, one of which had perforated. Everywhere else in the abdominal cavity there were evidences of peritonitis. The stomach contained a considerable amount of bloody mucus.

From this case the reporter drew some practical deductions: First, in the matter of diagnosis, the history was misleading, the patient stating that he had never suffered from any gastric disturbance or from any abdominal pain, even of appendiceal character. Even if it had been possible to interrogate the patient before he became so engrossed with his present distressed condition, some points might have been elicited which would have materially assisted in making a more accurate diagnosis, especially in determining the cause of the peritonitis from which it was very apparent that he was suffering. The sudden escape of gas on opening the abdominal wound is almost significant of perforation from either gastric or duodenal ulcer owing to the rapid fermentative changes that occur in the visceral contents of this region, rather than to a ruptured appendix or gall-bladder, and under these circumstances it will be always well to seek for the trouble in the upper part of the abdomen rather than waste time in attempting to find a perforation lower down.

It has been advised by medical authorities that some coloring matter, as methylene blue, may be administered by the mouth, and its escape through the perforation into the peritoneal cavity will then facilitate the location of the ulcer after the abdomen has been opened. This may hold good in ulcer of the stomach, where the fluid would naturally pass out quickly without any digestive changes having taken place; although this procedure will hardly lend itself to the practical surgeon any more than the puncture of the abdomen with a hypodermic needle in the hope that gaseous bacteria and cellular evidences of perforation can be aspirated. Unfortunately in this class of patients, before operative procedure has been determined on, the general condition has become so grave that the time spent in prolonged search in the different parts of the abdomen will militate very materially against a favorable result.

The ordinary signs of perforated peritonitis are well known, namely, (*a*) pain, which is often misleading as to its position, (*b*) great muscular rigidity, (*c*) a flat abdomen, and (*d*) at times

the disappearance of liver dulness, especially when due to gaseous distention from the escape of the stomach's contents.

Again, the sex may be of some assistance in unravelling the diagnosis, perforating gastric ulcer being more common in women; according to Weir's tables 80 per cent. being thus affected, and in perforated duodenal ulcers the figures are about reversed, showing that men are much more liable to duodenal ulceration than women.

It is hardly necessary to say that the surgical treatment of perforated peritonitis cannot be too prompt. If the diagnosis can be narrowed down to either the stomach, duodenum, or gall-bladder, the incision should be along the edge of the rectus muscle, which may be supplemented by one at a right angle to it, across its upper portion; if more room is demanded, it is of great importance that the operative field should be sufficiently exposed to permit a rapid survey of the supposed site of perforation.

If food or material has escaped, the surgeon's action is rendered more certain, and a rapid, thorough inspection after wiping away any escaping fluid will accurately disclose the region of perforation. If nothing is visible in this region, the examination of the posterior gastric wall can be accomplished by either tearing through the gastrocolic omentum, or by turning up the omentum and large bowel and the lesser omental cavity through the mesentery as in posterior gastro-enterostomy. From the lower end of the wound, which is large enough to admit the hand, the appendiceal region can, if necessary, be easily explored. When the perforation is found it should be closed by a double or triple row of sutures. No attempt should be made to excise the ulcer before suturing, as this takes time; and in the collected cases of operations it is shown that results are not any better where this procedure has been resorted to. The closure of the perforation, however, leaves much of the trouble still unfinished. The proper and systematic cleansing of the peritoneum is then of the utmost importance. If the extravasation is limited, careful wiping out of the affected portion of the peritoneal cavity with gauze will in most cases suffice better than the large, warm irrigations of sterile salt solution, which are more suitable in extensive or general peritonitis. The systematic cleansing of the peritoneal cavity

will be of the utmost importance, and too great care cannot be given to this procedure.

If there is any question in the mind of the surgeon as to his ability to close the perforation, a small packing of iodoform gauze may be left in around the sutures and allowed to remain forty-eight hours; but this is rarely necessary if careful and systematic suturing with two or three rows of carefully introduced sutures has been resorted to. It is needless to say that the mortality in this condition is very great, the percentage of recoveries being exceedingly small. In perforating gastric ulcer, according to the paper published by Weir, the mortality was 78 per cent., the patients dying invariably of shock or peritonitis.

TRANSACTIONS OF THE PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, October 1, 1900.

The President, DE FOREST WILLARD, M.D., in the Chair.

DISLOCATIONS OF THE TOES.

DR. GWILYM G. DAVIS reported the following case: Miss A., aged thirty-six years, rather stout, while jumping from a carriage to the ground felt a pain in the forward portion of her right foot. She thought she had sprained it, and kept off her foot for a few days, and then began walking about, though it still pained her. Her physician examined the foot, but could discover nothing but a sprain. Walking continued painful, and eleven weeks after the reception of the injury she consulted Dr. Davis. On a casual examination there appeared to be little except a tenderness to pressure on the metatarsophalangeal joint of the middle toe of the right foot. On more careful examination it was seen that when the foot was placed on the ground the affected toe was separated from the adjacent ones by a slightly greater space than appeared natural or when it was off the ground. On feeling for the head of the metatarsal bone in the sole of the foot it felt a trifle, but only a trifle, more prominent than the others. On following down the metatarsal bone on the dorsum of the foot the region of the phalangeal joint did not appear so clearly outlined as did those on each side; there seemed deeper sulcus at this point than there ought to have been. Pain on pressure was most marked over the head of the metatarsal bone in the sole of the foot. There was no apparent shortening of the toe. These signs and symptoms were such as to cause him to form the opinion that a dislocation was the cause of the trouble, and this diagnosis was confirmed by the X-ray.

The character of the injury having been ascertained, attempts

at reduction were made, but proved so painful that cocaine was injected, and by forced manipulation the toe was brought into place. It was found impossible, however, to keep the toe in place, so ether was administered, and the extensor tendon, that seemed to be the main agent in causing the dislocation to recur, was divided and the phalanx again replaced.

A plantar splint was applied with a pad extending as far forward as the heads of the metatarsal bones. The affected toe was then flexed firmly over this pad and bound down with adhesive plaster to the splint beneath. The toe was kept in this position for about a week and then the splint was removed, and the patient began walking. In about ten days she stated that the toe was again out of place. She resumed her occupation as nurse, and while she at times had some pain, still, it was not sufficient to cause her to lay up, and she soon afterwards left the country.

Dr. Davis added that he felt sure that both an ordinary fracture and sprain at the end of eleven weeks would be practically recovered from, and that the persistent disability was due to a displacement of some sort which was still present, for in cases of sprains, and of small joint dislocations which have been properly reduced, almost or quite perfect function is restored in a comparatively short time if use is made of the injured member. This is seen in the injuries to the finger-joints so common in ball-players. In fractures, also, union in fair position is usually followed by quick restoration of function.

As to treatment, the case shows that old dislocations of the toes are just as unsatisfactory to treat as old dislocations of the larger joints; also that in some cases, at least, it is almost impossible to prevent the dislocation from recurring, and that simple division of the extensor tendon and replacement are not sufficient.

The question of treatment still remains to be solved. Should another case of as long standing as the present one present itself for treatment, he would be inclined to adopt the following course: Etherize the patient, lay open the joint from above, divide the capsule freely, and also one or both tendons, so as to replace the luxated phalanx into position, and leave it there resting loosely in place without any muscular or ligamentous attachments which might tend to displace it. That this would produce a stiff joint is

not likely, if suppuration was avoided and use of the part early resorted to. If it was desired at all hazards to surely relieve the patient at once of his disability, he would amputate the toe and not attempt a resection. Resection of these joints, done usually on the fourth toe for metatarsalgia, has not been altogether satisfactory; control over the toe is lost, and sometimes it overrides its neighbors and gets rubbed by the shoe; while at others it gets caught beneath them and becomes very painful; in either case it becomes a nuisance which may demand removal. This is the experience of Dr. Thomas G. Morton, who has said that he now prefers amputation to resection for cases of metatarsalgia.

OPERATION IN THE PREPERFORATIVE STAGE OF TYPHOID.

Dr. Robert G. Le Conte detailed the history of a colored man, aged twenty-three years, who was admitted to the Pennsylvania Hospital, December 23, 1896. He had been well and at work until three days previous to admission, when he began to have pain in the pit of his stomach, with constipation of his bowels and loss of appetite. The pain soon shifted to the right iliac region and became very severe and constant. He had chilly sensations with fever, but no vomiting, headache, epistaxis, or pain in the back, and none of the prodromic symptoms of typhoid fever. On admission, temperature was $102^{2}/_{5}^{\circ}$ F.; pulse, 88; respiration, 20. Tongue heavily coated all over, not tremulous. Specific ulcer on the left arch of the palate. Heart, lungs, and urine negative. The abdomen was distended and tympanitic; the right abdominal muscles much more rigid than the left; exquisite tenderness over the iliac fossa, with a small, easily palpable tumor which was dull on percussion. No enlargement of the spleen was demonstrable.

With the above symptoms and a history of sudden onset, a diagnosis of appendicitis was made, and immediate operation advised. The patient was etherized, and the abdomen opened over the tumor to the outer side of the semilunar line. Serous fluid with flakes of lymph immediately escaped. The last six or eight inches of the ileum were sharply bent on itself and glued together with recent adhesions. These adhesions were broken up, and this portion of the ileum with the cæcum and part of the ascending colon were delivered through the wound. This portion of

the bowel was highly inflamed, deeply congested, and covered with lymph. On washing away the lymph, some six or seven spots were seen, about the size and shape of a small olive, purple in color, with bluish-black necrotic centres. These necrotic areas were on the cæcum and ascending colon as well as on the ileum, and were on the portion of the bowel opposite to the mesenteric attachment. They were unquestionably necrotic Peyer's patches that had ulcerated through to the peritoneum. The appendix was normal except for its peritoneal coat, which had become infected from the neighboring inflammation. It was evident at a glance that if the bowel was returned in such a condition perforation would speedily take place and peritonitis and death follow.

Three methods of procedure presented themselves: (1) Invaginating the necrotic areas with sutures. This was not attempted for fear the sutures would not hold in such a diseased state of the intestine, and if they did hold, that stricture of the gut would result. (2) A resection of the damaged area, some eight inches of the ileum, the cæcum, and part of the ascending colon. This was rejected, owing to the patient's condition not warranting such a radical procedure. (3) Packing off with gauze this area of the intestine from the general abdominal cavity. This was done, and at the same time the appendix was amputated, on account of its damaged peritoneal coat and the fear that it might cause further trouble. Two sutures were placed in the upper angle of the wound, while the ends of the gauze packing filled up the rest of the incision. The temperature following operation was normal, but it speedily rose to $104^{1}/_{5}°$ F. The pulse, however, was of good character, and at no time exceeded 120. Thirty-six hours later very offensive pus and fæcal material were discharged from the wound. Ten days later the fæces began to lessen in amount, and within four weeks of the operation the fistula had entirely closed. In the mean time the patient developed a typical typhoid condition. His tongue became tremulous; the edges cleaned off, sordes developed, mental hebetude appeared, emaciation was rapid, the bowels were loose, and tympany persisted. The blood was twice subjected to the Widal test, and responded both times. The temperature for twenty days varied from 101° to 103°, when it gradually dropped to normal, and then became slightly subnormal. From this time on the convalescence was uneventful, and he rapidly gained the weight he

had lost. He was discharged from the hospital in good health fifty days after admission.

Dr. Le Conte called attention to the early date at which perforation may occur in typhoid fever, and also to the fact that in anomalous cases of enteric fever the diagnosis from appendicitis cannot always be made.

DR. G. G. DAVIS remarked that the case was so close to one of perforation as to be practically one of perforation. It furnished data as to how long a patient may be in recovering, provided packing is resorted to and a fæcal fistula ensues. There is no doubt that in some of these cases there is not time to perform an ideal operation, in other words, to close the perforation; the chances of the patient's recovery will be enhanced by treating the case as did Dr. Le Conte,—isolating the infected area and draining rather than invaginating and suturing. He believed it to be a fact that typhoid-fever patients stand operation very much better than is usually supposed or than one might expect. If surgeons resort to operation as readily as some advise, attempting the diagnosis of the preperforative stage, no doubt they will operate occasionally and not find a perforation. He had done so in one case. He reported three cases in the *University Medical Magazine* a few months ago, and in one of them there was no perforation found; yet that patient improved very markedly. There was some evidence of peritonitis, and the operation appeared to benefit the patient very markedly. Therefore, even if one does not find a perforation, the operation will probably be of benefit to the patient.

SHOT AS A NUCLEUS OF VESICAL CALCULUS.

DR. ROBERT G. LE CONTE said that a man, twenty-six years of age, was admitted to the Methodist Hospital, April 26, 1896, with the history that while rabbit shooting, four and a half years previous to admission (November, 1891), his companion's gun was accidentally discharged, and he received most of the charge in his left thigh and hip. Two days later he passed fourteen shot with his urine. As a result of the injury, he was in bed five weeks. He was then perfectly well for nearly four years, when he began to have frequent urination, with some pain across the abdomen and in the pelvis. Gradually the symptoms of stone developed, *i.e.*, pain referred to the end of the penis, pain on

jarring motions, blood at the end of urination, sudden stoppage of the stream, etc. The passage of a sound revealed a small movable stone. Two days after admission, the patient was etherized and litholapaxy performed. A shot, about No. 6 size, came away with the washings from the bladder. The fragments of stone collected weighed 120 grains. The patient returned home on the third day, relieved from all symptoms.

DR. GEORGE G. ROSS mentioned the case of a young man, eighteen years of age, who, having symptoms of stone, was subjected to litholapaxy, and in withdrawing the small crusher a piece of leather shoe-string encrusted with small particles of stone was found in its jaws. It was thought that all the stone had been removed. He, however, redeveloped symptoms of stone, and was operated on again through the perineum, and seventeen inches of shoe-string were removed.

DR. W. G. PORTER said that some years ago he removed a stone from the bladder of a man, the nucleus of which was a twig of a tree. The patient's story was that he had a stricture of the urethra, for which he was occasionally required to use a catheter. On one occasion, when away from home in the wilderness, beyond the reach of a doctor and without a catheter, he was suddenly seized with retention of urine. He cut off a twig from a tree, smoothed it down with his knife, and succeeded in passing it into his bladder. When he withdrew it the urine followed it; and he thought at the time that a portion of the twig was broken off and remained in his bladder. Soon after symptoms of stone appeared; and at the time of the operation he had a very tight urethral stricture, which had to be relieved before the stone was removed by litholapaxy.

PERFORATION OF THE SMALL INTESTINE RESULTING FROM THE KICK OF A GUN

DR. WILLIAM J. TAYLOR related that on Saturday, July 28, 1900, a young man of twenty-three was out shooting, using an ordinary double-barrelled shot-gun. This gun was accidentally discharged while he was holding it in front of his body, so that he received a very severe kick from it in the right iliac region. There was intense pain, and he had great difficulty in getting back to his home. Pain and tenderness continued all the next day, and on Monday, the 30th, he was brought to Philadelphia, arriving here

at eight o'clock in the evening, after a journey of five hours. Dr. Taylor saw him immediately on his arrival, and found him to be suffering from general peritonitis, with special pain and tenderness in the right iliac fossa. His temperature was 102° F., his expression anxious, but his pulse fairly good. Within an hour thereafter the abdomen was opened. There was general peritonitis, with masses of lymph here and there over the intestine. Two coils of small intestine were glued together at one small point. This was separated very easily with the finger, no force at all being used, when immediately there was a gush of liquid fæces, and a perforation was seen in the wall of the bowel about the size of a lead-pencil, with ragged, sloughing edges. The lymph from the intestine was carefully wiped off, and there was such gaseous distention that the contents of the gut were milked out of this perforation. The opening in the bowel was invaginated and closed by a double row of silk sutures. A search was now made for the appendix, which was discovered to be post-cæcal and very difficult to find. Its tip was slightly clubbed, and, in view of the possibility of subsequent danger, it was removed. A very careful toilet of the peritoneum was made and a search for further perforations or evidence of ulceration in either the large or small intestine. None, however, could be found, nor any evidence of thickening of the intestinal wall. Drainage was introduced, a wick of gauze wrapped in rubber dam.

He gave a history of not having felt very well for some two or three weeks, and, to eliminate the possibility of his having had a walking typhoid, some of his blood was sent to the city bacteriologist for examination by Widal's method, but a negative report was made. He was profoundly poisoned by the septic peritonitis, and, in spite of every effort made to save him, he died seven days after the receipt of his injury.

DR. RICHARD HARTE said that this case emphasized the importance of dealing surgically with severe contusions of the abdomen. He was convinced that the results would be much better in dealing with these injuries if the abdominal cavity were opened, in properly selected cases. In four cases of abdominal contusions which had been admitted to the Episcopal Hospital within a short time, in two there were ruptures of the liver and in two ruptures of the intestine, one of which was very much of the same character as the case cited by Dr. Taylor. A man while attempting

to escape from a falling beam fell, and the point of a pair of pliers which he had in his pocket struck the abdomen and made a small puncture, but did not enter the bowel. There was evidence of abdominal contusion. Dr. Deaver opened the abdomen and found a perforation of the bowel, simply by contact with this blunt instrument.

In determining when the abdomen should be opened, he thought that a man's surgical sense had to be relied on to a great extent. There is a class of cases where the element of shock is very noticeable and where the reaction is slow. There is evidently some disturbance going on which demands surgical interference. These cases, if left to themselves, will soon become tympanitic and present all the symptoms of traumatic peritonitis, and will in a short time die; but if they had been opened immediately, and if possible before the shock had become too profound, conditions would be found in many of the cases which could have been dealt with surgically. Of course, there are cases where surgical interference will be of no avail, as in case of rupture of the liver or some of the abdominal viscera; but where there is hæmorrhage, or where the intestine is ruptured, as so often occurs, with or without extravasations of its contents, most favorable results can be obtained in dealing with these cases by opening the abdomen and seeking systematically for the trouble; and the element of risk involved by this procedure in doubtful cases is slight compared with the old method of dealing with these cases.

ENTERORRHAPHY.

DR. M. J. O'HARA, JR., presented a specimen that showed an end-to-end anastomosis done after the method he presented at the April meeting. This specimen was removed from a large Newfoundland dog fifteen days after operation; it shows the character of the union obtained, and also the appearance of the gut on the inside. The sutures used on one aspect was the Halstead, on the other a continuous Lembert. His preference was the Halstead, as with this suture he got better approximation and no adhesions to the surrounding structures. The specimen was preserved in Pick's solution. This dog was up and around hunting for something to eat in eight hours; he was fed at once on ordinary dog food, and did not seem to mind the operation in the least. In placing his sutures, he had endeavored to carry them

down to the mucous coat, so that if any hæmorrhage occurred it must be within the bowel. None of the cases that he had observed had any bleeding from the bowel. The operation by his method was a perfectly bloodless one. The larger blood-vessels in the mesentery may cause some annoyance, but wherever it could be done he avoided cutting them.

WOUND OF THE DIAPHRAGM AND STOMACH.

Dr. De Forest Willard read the history of a boy, two and one-half years of age, who fell from a second story window, striking upon a sharp picket fence, and remained fixed upon the paling until removed by his father; the paling was not broken. A large lacerated wound was found in the left upper quadrant of the abdomen, and several feet of intestines immediately protruded from the wound. No injury of the intestines being discoverable, they were returned to the abdomen, and three stitches were inserted by the attending physician in order to retain them in position during the transit of forty miles to the Presbyterian Hospital. The symptoms of shock steadily progressed, so that by the time the reporter saw the child, some five hours after the accident, the pulse was flickering and feeble, and the respiration rapid. His desperate condition was evidenced by the fact that it was possible to operate upon so young a child without an anæsthetic, and with very little complaint of pain.

Upon cutting the stitches, an irregularly horseshoe-shaped tear, four to five inches in length, was found in the abdominal wall, with its base towards the ribs. The intestines immediately protruded. The wound was enlarged with scissors, when it was found that the stomach and a large portion of the intestines had passed into the pleural cavity through a large tear in the diaphragm, readily admitting the entire hand. When the stomach was drawn down, a lacerated wound, one and one-half inches in length, was discovered upon its anterior wall, which was quickly closed with Lembert's sutures and packed off. As there was a large quantity of blood in the pleural cavity, a long probe was passed through the diaphragmatic wound across the pleural cavity, and a large drainage opening made in the posterior part of the thorax, into which a large tube was inserted. The wound in the diaphragm was closed with catgut sutures; the abdomen

was flushed with hot salt solution, and gauze packing introduced around the stomach and in the wound.

Although the child was in a desperate condition at the beginning of the operation, all the manipulations were completed and the child placed in bed; but he sank steadily, and died from the shock.

From the direction taken by the paling, it is probable that the heart itself was badly contused by the point. At the autopsy it was found that the rent in the stomach and diaphragm had both been tightly closed by the sutures, and had not the shock of the accident been sufficient to kill the child, his chances for recovery would have been favorable. The left lung had collapsed.

TRANSACTIONS OF THE PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, November 5, 1900.

The President, DE FOREST WILLARD, M.D., in the Chair.

INFECTION BY THE BACILLUS AËROGENES CAPSULATUS IN AN OPEN FRACTURE OF THE RADIUS AND ULNA.

DR. JOHN B. ROBERTS said that he desired to put on record a case of gangrene of the forearm after an open fracture, which appears to have been due to infection with the gas bacillus.

A young girl, aged twelve years, slipped and fell on August 31, 1900, sustaining a fracture of the left radius and ulna about the junction of the middle and lower thirds. One of the fragments of the ulna made a small wound through the skin. Dr. J. H. Hardcastle, who had charge of the case, cleansed the wound with soap and water and solution of corrosive chloride of mercury (1 to 1000), and dressed it with iodoform gauze and cotton. He says that there was a little dirt over the site of the wound when he first saw the patient, and that the bone did not protrude through the small opening, though he believed that the tear in the skin, which was perhaps a third of an inch long, was caused by the projection of the bone against the soft parts at the time of the injury.

When first seen by Dr. Roberts, on Friday, August 31, three days after the accident, the left hand was bluish black or slate color, and cold. A small wound of the skin existed on the palmar surface of the wrist over the lower part of the shaft of the ulna, perhaps one inch above the joint. It was a small puncture, and not gaping. The skin around this opening was blue and darker than the rest of the skin of the wrist or hand. The discoloration extended up nearly to the elbow, farther posteriorly than an-

teriorly. The arm was swollen and tense and crepitated on pressure. The arm above the elbow was swollen but not dark. The patient was etherized, and several long incisions were made from elbow to hand, through the skin and deep fascia, exposing bluish gangrenous muscles at places. Bleeding occurred from the upper part of the incisions, but not from the gangrenous areas in hand and forearm. The wound was dressed with wet mercuric chloride dressing. The patient had a temperature of 103.8° F., and albumen with casts in urine. She was clear-headed and did not complain of very much pain.

The next day he amputated about the middle of the upper arm, making first a circular incision about two inches below the elbow, hoping to save the joint and part of the forearm. This showed the disease in the deep muscles to extend higher than in the overlying skin. The tissues over the olecranon were blue, while in front the disease was not so high up. Finally, an irregular amputation was made by anteroposterior flaps above all gangrenous structures. The tissues left were, however, slightly crepitant. There was not much fluid in the tissues. He dissected the specimen along the radial and ulnar arteries near the injury, but found no rupture or laceration of vessels. The arteries seemed to have clot in them and were discolored. There was not much fluid and not a great deal of gas in the tissues. There was some gas, however, and a few blebs had shown themselves on the hand. The most active focus of death was near the small puncture, which suggested that infection had been caused by a gangrene-producing germ. Both bones were broken at the line of wound.

Two days after the operation urticaria was noticed upon the limbs and trunk. About half an inch of one of the flaps showed gangrene. An examination of the axilla showed no enlargement of the lymphatic nodes. The stitches were removed and the lips of the wound allowed to gap; and the arm was again dressed with solution of corrosive chloride of mercury, which had been used since the time of operation.

On the next day the patient spat about half a drachm of blood, which she thought came from her nose; but the temperature had fallen to about 100° F. The wound was the seat of a very offensive odor, and the gangrenous process in the flap had extended slightly. The dressing was changed to a solution of

1 per cent. formaldehyde. The urine still contained albumen. From this time the patient's condition rapidly improved. The foul odor was destroyed by the formaldehyde, the gangrenous process ceased, and the dead tissues became mummified. The albumen and granular casts disappeared from the urine, and the child was discharged from the hospital on the twentieth day after amputation, with, however, the wound not entirely healed.

The rapidity of the gangrenous process, the fact that the attending physician stated that the splint and dressings had not been applied unduly tight, the evident activity of the morbid condition around the site of the wound, and the crepitant condition of the limb above the seat of gangrene suggested that the unfortunate result of the fracture was due to infection with some gangrene-producing micro-organism. An examination of the amputated arm at the Pepper Laboratory was made by Dr. S. S. Kneass, who found the bacillus aërogenes capsulatus in the tissues. Dr. Hardcastle had recently informed the operator that at the time he dressed the wound and fracture, he was assisted by a girl who had been nursing a case of what was supposed to be erysipelas, the result of a wound of the arm from a meat-hook. Dr. Hardcastle did not know this at the time he accepted her as an assistant.

DR. M. B. MILLER said that, as far as he had been able to learn, this was the first case of infection by the bacillus aërogenes capsulatus recorded in Philadelphia or its vicinity. All the work on this bacillus in this country had been done in the neighborhood of the Johns Hopkins Hospital.

He had seen the patient with Dr. Roberts. There were two features about it which particularly impressed him,—one was the curious feeling of the gangrenous arm. The only thing that he could compare it to was the crepitant feeling of pulmonary tissue. The other feature that impressed him was that this gas formation was not only in the tissues themselves, but also involved the blood-vessels. Both in the radial and ulnar arteries the gas had formed in the form of long bubbles, with smaller areas of blood-clots in between, giving a beaded appearance that could be seen through the blood-vessel walls.

DR. HENRY R. WHARTON said that he noticed in Dr. Roberts's case a similarity between the clinical symptoms presented and those of traumatic spreading gangrene that surgeons used to see formerly, but which is rarely seen at the present time. Certainly

there were a great many symptoms in common with the infection produced by the bacillus aërogenes capsulatus and the infection that was present in cases of spreading gangrene—traumatic spreading gangrene—which was often seen in compound fractures, the form of gangrene described by the French writers as "bronzed gangrene." He had never seen cases in which the presence of the bacillus aërogenes capsulatus was demonstrated, and yet, from the description of these cases, there is a similarity to the cases of spreading gangrene. He remembered a compound fracture of the forearm in which this form of gangrene developed in twenty-four hours and spread rapidly from the forearm up to the shoulder. In this case, by prompt amputation at the shoulder-joint, the patient's life was saved. He formerly saw a good many cases of spreading gangrene, not only in his own hospital experience, but in that of Professor Ashhurst, in which prompt amputation saved many lives.

Dr. J. B. Roberts rejoined that Dr. Miller had just reminded him that Dr. Kneass reported to him that he found a pure culture of the bacillus aërogenes capsulatus. It was not a mixed infection. He had seen spreading traumatic gangrene where there was a great devitalization of cells from the injury itself; and he had seen cases of spreading gangrene, not after such crushing injuries; but he did not recollect ever having seen gangrene spread with such great rapidity as here, unless there was something in the extent of the injury or in the damage to the vessels to cause it. There was here a little wound, an insignificant thing, yet in three days the girl's arm was gangrenous irregularly up to the elbow; the temperature was 103.8° F.; and albumen and tube-casts were present in the urine. He believed that what used to be called hospital gangrene would, under the present bacteriological methods, be found to be an infection of this bacillus, the bacillus of malignant œdema, or some similar organism. The so-called bronze gangrene he was not familiar with. He had never seen angina Ludovici, which is probably an infection with the bacillus of malignant œdema. Many of the old descriptive names for various forms of gangrene have fallen into disuse, because bacteriological investigation has enabled surgeons to discard them for more accurate designations founded on the bacterial character of the infections.

LEFT-SIDED APPENDICEAL ABSCESS.

DR. FRANCIS T. STEWART reported the case of a boy, aged nine and a half years, who entered the Pennsylvania Hospital, August 8, 1899, suffering with diarrhœa and slight fever. There was nothing in the family or previous history bearing on the case. Four days before, after eating candy and pop-corn, he began to vomit, and complained of abdominal uneasiness. The bowels readily responded to a laxative, the loose movements persisting. On admission the abdomen was slightly distended and the lower right quadrant tender. The walls, however, were flaccid, and no mass could be felt externally or by rectum. He was sent to the medical ward with a diagnosis of enteritis. At the end of two weeks the tenderness had disappeared, the abdomen had become flat, and some induration could be palpated between the umbilicus and the left anterior superior iliac spine. On the nineteenth day, the mass having increased considerably in size, an incision through the abdominal wall was made by Dr. Le Conte, and a large quantity of foul pus evacuated. The abscess cavity was trabeculated and completely shut off from the general peritoneal cavity by firm lymph. The appendix was not found, nor was it diligently searched for. Six weeks later the wound had practically closed.

Dr. Stewart said that this case might be regarded as one of enteritis, followed by appendicitis travelling from the base outward to the tip, which lay to the left of the mesial line; the suppuration being caused by a migration of the bacteria rather than by a perforation, as there was neither gas nor fecal concretion in the abscess cavity. The pus was thought to be appendiceal from its character; but that the infection originated primarily on the right side is probable, because of the situation of the initial tenderness, as there was no transposition of the viscera, and because of the rarity of left-sided appendicitis. Edebohls (*New York Medical Record,* November 25, 1899), who has made a very exhaustive study of the literature of appendicitis, says, "As regards left-sided appendicitis, the only genuine case thereof on record is that of Biegi (*Med. Moderne,* 1897, viii, p. 643), which occurred in a soldier who died of appendicitis, and was found on autopsy to have a complete transposition of all the viscera. The case of Bontecou (*Transactions of the Medical Society of New York,* Albany, 1873, lxvii, pp. 137-139), in which death resulted

from ulcerative perforation of the small intestine into the left iliac fossa; that of Traube (*Medical News,* 1893, lxiii, p. 604), of a perityphlitic abscess pointing on the left side; and the three cases reported by Fowler, in which the cæcum and appendix were displaced to the left, all originated primarily in the right iliac fossa. So did the case of Coates ("Manual of Pathology," 1895), in which empyema of the left chest followed perforation of the diaphragm from an abscess of appendicular origin."

APPENDICITIS COMPLICATED WITH LEFT-SIDED ABDOMINAL ABSCESS AND LEFT PYOTHORAX.

DR. STEWART reported a second case, for which his thanks were due to Dr. Morton for the privilege of operating upon and reporting. A man, aged nineteen years, was admitted to the Pennsylvania Hospital, November 7, 1899, after having suffered five days with abdominal pain. There had been no chill, vomiting, or constipation. Nothing relevant in either the family or previous history could be ascertained, except that he had been struck a smart blow over the appendix several days before the onset of pain. He had had the opportunity to observe several patients who attributed their appendiceal trouble to injury. Small (*Medical Record,* September 10, 1898) reports thirteen cases of appendicitis with a clear history of trauma. The temperature was 100° F.; respirations, 28, and pulse, 100. Both recti were hard, the pain active, and tenderness most marked at McBurney's point. No mass could be felt and no dulness elicited, although, as was afterwards ascertained, the appendix lay just beneath the abdominal wall. An incision in the right semilunar line was immediately made, opening a large abscess which was completely isolated from the surrounding peritoneal cavity. The appendix measured three inches, pointed directly inward, the tip adhering to the parietal peritoneum just to the left of the midline, and the outer two-thirds was gangrenous. During enucleation the distal extremity was ruptured. There was no foreign body and no fæcal concretion. The abscess cavity was loosely filled with gauze. On the third day the temperature reached $101\frac{1}{5}°$, and thereafter varied between 99° and 102° until the second abscess was opened. On the ninth day he had a chill, the discharge which had been profuse became scanty, and a mass was detected in the lower left abdomen;

this was opened on the twelfth day, evacuating several ounces of foul pus. The patient was comfortable and the temperature normal for twenty-four hours, when, after feeling chilly, the temperature arose to 103°. As the discharge from the abdominal wounds decreased, the symptoms of sepsis increased. On the twentieth day there was another chill, followed by a temperature of 104°, and this by a profuse sweat. On the twenty-first he suddenly expectorated a large quantity of foul pus containing the bacillus coli communis, severe axillary pain followed, and at the end of twenty-four hours the expectoration had ceased, the left chest had become flat, and the heart had moved to the right. The pleural cavity was opened through the seventh interspace and a rubber tube inserted. From the foul brown liquid which escaped cultures of the colon bacillus were obtained. The temperature fell to normal and recovery seemed assured, when on the thirty-first day he began to complain of increasing abdominal pain. He became constipated, peristalsis could be seen above the wounds, and fever again appeared. It was feared that adhesions obstructed the fæcal current and that a fourth operation would become imperative, but the bowels were finally induced to move, and on the thirty-fifth day, four days after the onset of abdominal pain, he was again comfortable. He was discharged on the thirty-eighth day, with a small tube still in his chest and both abdominal wounds closed. Since leaving the hospital there have been several attacks of pain, with transient constipation.

A pronounced feature of this case was the rapidity of abscess formation and the remarkable recuperative power, both general and local, which was exhibited. The primary abscess promptly closed when the second was opened, which in turn rapidly healed when the pus migrated to the thorax; the pulmonary abscess discharged through the mouth only twenty-four hours, and sixteen days after the empyema was drained the patient was able to go home. And this, with the absence of joint, liver, and endocardial inflammation, would seem to indicate that the suppurative process extended by contiguity rather than by the blood channels, as in pyæmia. There were no symptoms of diaphragmatitis, and the abdominal abscess apparently did not extend as high as the abdominal dome.

In Edebohl's (*Ibidem*) article there are recorded nine cases of appendicitis with lung complications,—four of these were em-

pyemas, three perforation of the lung by abscess, one gangrene of the lung, and one pneumonia. Weber (*Deutsche Zeitschrift für Chirurgie,* February, 1900) reports nine cases of subphrenic abscess; in six of these right-sided pyothorax developed, and in one of these perforation of the diaphragm was found. Jeanmire (*Gazette Hebdomadaire de Médecine et de Chirurgie,* March 1, 1900) puts on record a case of appendiceal abscess opening into a bronchus and followed by recovery.

DR. JOHN B. DEAVER said that he thought the report of these two cases to be very strong arguments in favor of early interference and against delay in operating upon appendicitis. He had seen cases similar to those described by Dr. Stewart time and time again. They are always late cases. This left-sided condition of the appendix is not an uncommon condition. He took the credit of first calling the attention of the profession to pain in the left side as indicative of a southerly position of the appendix. In these cases he always took the appendix out and had never made an incision on the left side of the abdomen. He did not think for one moment that this was originally a case of enteritis. It was appendicitis from the start.

In operating, he incised over the seat of the appendix, that is the normal position of the appendix, and worked his way down into the pelvis and removed the appendix, drained, etc. Although it is the practice of some physicians to tap them through the rectum, and, in a few cases in the female, through the vagina, this practice he highly disapproved of. These cases demonstrate the ravages of appendiceal pus. He had seen pus make inroads in cases where the physician in attendance did not recognize the condition. He had seen a number of cases where appendiceal abscesses had ruptured into the lungs, and by way of the bronchus escaped through the mouth. These are not very uncommon conditions in late cases. There is very much that can be said on the subject, but nothing against early interference, interference at the earliest possible moment.

FRACTURE OF THE FEMUR IN AN INFANT.

DR. H. AUGUSTUS WILSON reported the case of a well-nourished infant of three months, who was brought to him with a marked fulness in the upper and inner part of the left thigh, which was palpably due to a bony mass just below the great trochanter.

Examination showed the enlargement of the thigh to be probably due to a mass of callus and malposition following a fracture, the fragments having united at an obtuse angle, the apex pointing forward. There was no demonstrable shortening, and it was inferred that no overlapping had taken place.

He availed himself of the presence in Philadelphia of Dr. H. M. Sherman, of San Francisco, who operated upon the patient on May 5, 1900, at the Philadelphia Hospital. Incision of the soft parts overlying the mass showed that the swelling was due chiefly to a very large mass of callus, and that there had been a fracture just below the great trochanter, and union had taken place, as surmised, with angular deformity, which was far less than external appearances indicated.

The exuberant callus was chiselled away, the fracture reproduced, and the fragments put in apposition in proper position. It was found impossible to make the delicate bone hold a silver-wire suture, and therefore maintenance of apposition was secured by splint. The wound was closed with catgut suture, a small sterile gauze drain being tucked into its middle, which was removed the next day without removing the outer gauze dressings.

The plaster-of-Paris splint included both legs and extended up to the chest, being in effect a double spica of the thighs and hips. The legs were moderately abducted and a light stick, reaching across from one foot to the other, was included in the bandage, and thereby increased stability.

During the application of this apparatus, Dr. Sherman devoted his especial attention to the position of the affected leg, to secure the best possible position of the fragments. Recovery was uninterrupted, and at the expiration of four weeks the original dressings were finally removed, and the result found to be perfect.

Dr. Wilson said that the question of causation of this fracture was of moment from the medico-legal stand-point, as the obstetric procedures at the child's birth were unusual. The delivery was accomplished by Dr. Edward P. Davis, who would state the difficulties encountered.

In the opinion of Dr. Sherman the history was one of a plain procedure with no serious complications. The only force applied to or transmitted through the femur was simple traction, slight leverage was used, or could have been used. Furthermore, the whole of the traction force did not act on the femur, for the mus-

cles between the tibia and the pelvis, both on the front and back of the thigh, must have taken some of it. It may be that, rarely, this procedure could cause a dislocation of the hip; but it is very unlikely, hip dislocations being much more easily accomplished if the thigh is flexed on the abdomen and then force applied to the knee, pushing the femoral head over the lower and hinder part of the rim of the acetabulum where it is low.

The clinical history after delivery showed no immediate disability, but one that developed a few days after birth. The inference is unavoidable that the fracture was either intrauterine or occurred after delivery. As no history of fall can be obtained, it would appear that the fracture was intrauterine, with slight manifestations which made it possible to overlook its existence at the casual examination made by Dr. Davis's instructions immediately after delivery.

Dr. Sherman had further called attention to the fact that obstetricians endeavor, in getting hold of the child's limbs in utero in order to move them, to seize them near a joint. Naturally, the hip-joint would be the one most accessible, and the femur the bone most frequently grasped. If a finger is slipped into the groin and traction made to extend the thigh, and so pull down the leg, the work is done at a disadvantage, for the weight, the leg, and foot are on the long arm of the lever, that is, the distance between the finger and the knee.

Kustner (*Handbuch der Geburtshülfe Muella,* iii, p. 311) says that if the finger or a hook slips upon the femur in doing this, the bone will break at its upper third, as that is its thinnest part, and that the fracture occurs at that part, if the force is used near it.

A case was reported from Professor Rubeska's Clinic in 1893 in which the femur broke at this place in a spontaneous delivery. In *Archiv für Gynäkologie,* Band xxx, p. 264, is reported a case with many fractures, both femora at the middle among them. Still, it would seem to be right to get the finger slipped along the front of the thigh to the knee as soon as possible to get the force near to the weight and shorten that arm of the lever. He was permitted to report also two cases seen by Dr. H. M. Sherman, as follows:

CASE I.—June 23, 1894. An eleven weeks' old girl baby, normal apart from a deformity which consisted in a shortened

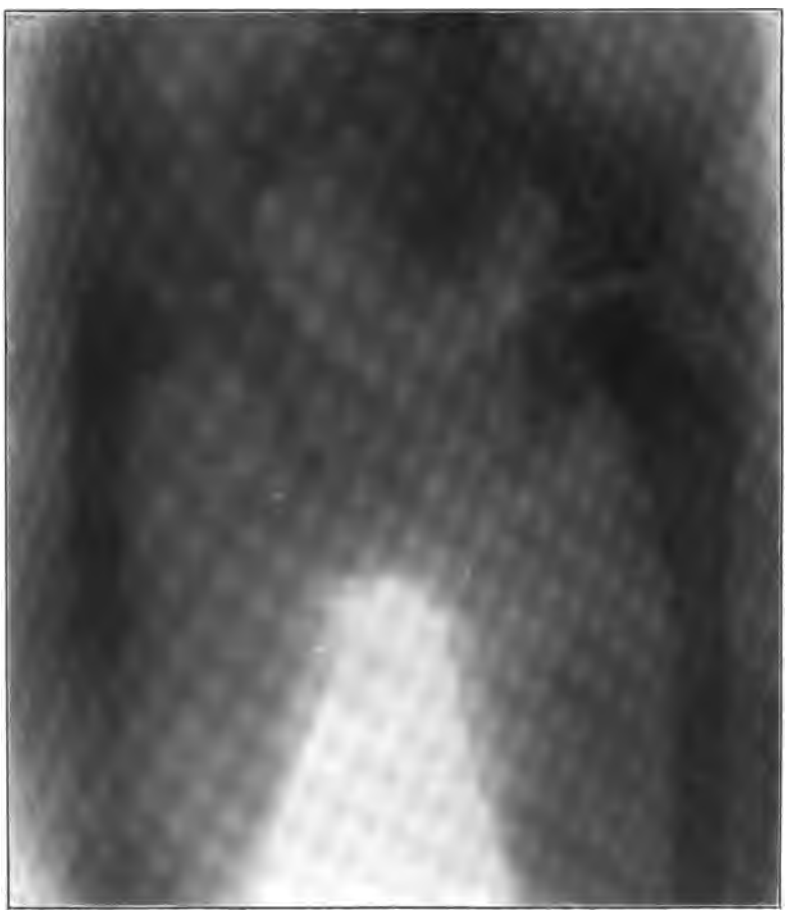


FIG. 1.—Congenital deficiency of the left femur.

condition of the left thigh, all the tissues being affected, the shortening being 4.5 centimetres. The history was of an easy non-instrumental birth, after a healthy and comfortable pregnancy. The mother was twenty-three years old, and this was her first child. The shortened condition existed at birth, but the child kicked the leg normally. During the last few days the child has held the leg flexed, and has cried if it was moved or handled.

Examination shows a depression or dimple in the skin on the outer side of the thigh at its middle. The knee and the leg and foot are normal, and of the same size as those of the other side. It is not possible to make out the femur through the soft tissues above the middle of the thigh. A false point of motion can be made out at about this point, and at times crepitus can be felt. There has evidently been an intrauterine fracture and much overlapping, and this must have occurred so early in intrauterine life as to have permitted the soft tissues to fit themselves to the shortened bone. Union probably took place with this overlapping, and a refracture has occurred within the past few days. There is nothing in the history of the mother's pregnancy that can explain the occurrence of the fracture.

July 30, 1894. This baby was put in a portable apparatus which permitted vertical traction to be made on the limb, and this was removed a few days ago. The child now kicks the leg about as she does its fellow. It is still impossible to palpate the upper part of the femur or the trochanter through the soft tissues.

August 14, 1894. To-day the presence and position of the trochanter can be made out. The limb is, roughly, 6.25 centimetres shorter than its mate.

December 12, 1894. To-day, through the dimple or cicatrix on the outer side of the thigh, the lower end of the upper fragment of the thigh can be felt. The shortening is the same.

July 15, 1896. The shortening is now eight centimetres, and is all in the femur. With a lift under the shoe, to compensate the shortening, the function of the limb is perfect.

August 16, 1897. The shortening is now nine centimetres. Child healthy and active.

August 28, 1898. The shortening is now 10.5 centimetres, and all in the femur.

September, 1900. This child has been found and has been radiographed, and the result is very confusing. There is a plain

coxa vara, with the appearance of the femoral neck having been fractured rather than bent down. This was probably the site of the fracture that was diagnosed, but incorrectly located, in June, 1894. There is no evidence of there ever having been any injury to the shaft of the femur, and the apparent discovery of the lower end of the upper fragment, in December, 1894, was a mistake, which is not now possible of explanation. The limb is still shorter, and the location of the fracture may explain the constant increase in the shortening by a possible injury of the epiphysis and interference with growth, both directly at the epiphysis and, by reflex action, through the whole femur.

The thigh is now, September, 1900, twelve centimetres the shorter, that is, the shortening has increased 7.5 centimetres since birth. The leg is of the same length as its fellow. The function of the joint and limb is perfect, and with a high patten, to compensate the shortening, the child gets about as well as other children.

If this case was one of fracture of the femoral neck in a newborn baby, the case must be a unique one.

CASE II.—September 11, 1899. The child, a seven months' old baby, was born with the left thigh much shorter than the right. The skin and other tissues fit the short leg, *i.e.*, the tissues of the limb are shortened. No history of injury to the mother during pregnancy. No injury to child during delivery.

There is an angular deformity of the shaft of the femur, due to union in a faulty position after, possibly, intrauterine fracture of the femur. Child otherwise apparently normal.

The radiograph shows delayed ossification at the lower epiphysis and the entire absence of the upper epiphysis of the femur. Ossification in the shaft ends a little above the middle, and at the middle is a curve or knuckling of the bones or a faulty position after a fracture.

The prospect of benefiting the boy is slight; treatment is withheld, at any rate, for three months.

DR. EDWARD P. DAVIS said that the case which Dr. Wilson had described was that of a rhachitic pelvis, in which labor began with the vertex presenting and the back directed to the left side of the mother. When the mother became exhausted, the forceps was applied and the head brought into the pelvic cavity, but the effort to deliver the head was not successful. It was found that

FIG. 2.—Shows delayed ossification at the lower epiphysis and entire absence of the upper epiphysis of the femur.

the shoulders had become impacted at the pelvic brim, the body of the child being turned transversely, and that delivery could not proceed. Accordingly, the forceps was removed and version was performed. The selection of version as a mode of delivery arose from the fact that in version one can much better control the delivery and passage of the shoulders through the pelvic brim.

In performing the version, it was found that owing to the long-continued labor, the escape of the amniotic liquid, and efforts at delivery, the child's body had become extended, the limbs being no longer flexed, but the feet and knees being in the fundus of the uterus. The legs were grasped near the knees, the grasp upon the limbs being as extensive as possible, and gentle traction was made, while the body of the child was rotated during traction in such a manner as to bring the back of the child towards the mother's abdomen. This was not a case in which the finger or an instrument was hooked into the groin, because this was not a case of breech presentation. The version was exceedingly difficult because of the long-continued labor and the fact that the child had become unfolded. Considerable force was applied upon the femora and in the actual turning of the child's body; this force must not have been that of traction only, but of rotation as well. The child was slightly asphyxiated when delivered, but was soon resuscitated.

Immediately after birth, the child was examined, but no fracture or luxation was made out at that time. About ten days afterwards, the Resident Physician reported impaired motion and pain upon handling in this infant. The child was accordingly examined a second time, but still without eliciting evidence of fracture. It seemed that very probably the sacro-iliac joint upon the affected side had been injured. The child's general development proceeded without interruption. The possibility of a green-stick fracture or of injury to the epiphyses was always considered and admitted.

In this connection, he added a report of a case of complete fracture of the humerus occurring under the following circumstances. The patient was in labor without medical attendance. During the labor, the head presenting, the hand of the child presented also. A woman who was assisting the patient, becoming frightened, made traction on the hand, and by vigorous pulling ended the labor. The arm of the child was found broken at

about the middle. Mother and child were brought to the Jefferson Maternity, when a complete fracture was evident. The child was dressed by utilizing the body as a splint and bandaging the arm to the trunk. It made a perfect recovery in function, length of limb, and continuity of form.

Dr. Davis further remarked that in general, from the standpoint of obstetric surgery, surgeons may be called upon to deal with fractures of the cranium, fractures of the clavicle, and of the long bones of the extremities. Omitting fractures of the cranium, excessive width of the shoulders may result in fracture of the clavicle, and in some cases it is necessary to sever this bone to perform delivery. Fracture usually occurs in difficult version or in cases of head presentation where the arm or shoulder is pulled upon vigorously to secure delivery. In performing embryotomy, if the shoulders of the child be excessively broad, obstetricians sometimes perform cleidotomy, cutting the clavicles with stout blunt-pointed scissors. This allows the shoulders to collapse, reducing the transverse diameter of the trunk.

Injuries to the shaft of the humerus occur in version where the arms become extended. In bringing down the arms, the effort is made to pass the fingers along the humerus to the elbow, thus flexing the forearm and carrying the arm towards the body of the child. In spite of this traction, cases occur in which the mother's condition is so grave that delivery must be effected at once, regardless of injury to the child. He recalled the case of a woman, thought to be dying from disease of the heart, in whom it was necessary to perform version and extract the child as rapidly as possible. The child's elbow became impacted at the brim of the pelvis, and in bringing down the arm the humerus was fractured. The child made a good recovery with the application of simple dressings. Separation of the epiphyses of the humerus may occur instead of fracture in version. Fractures of the forearm are rare. Fractures in the shaft of the femur are not common, and usually follow cases of breech presentation, in which strong traction is made with a hook upon the child's extended thighs.

Luxations of the large joints of the fœtal body may occur as the result of difficult delivery. The joints of the pelvis are subjected to considerable strain in moderately contracted pelves when the child presents by the breech, and the descent of the breech

must be brought about by traction in the groins of the fœtus. A blunt hook, such as that found upon the handle of the Hodge forceps, is sometimes inserted into the groin and traction made in this manner. Whenever possible, the finger should be used in place of the hook, as injury is not so likely to occur.

So far as Dr. Wilson's case is concerned, it had been his impression that the fracture resulted during the version. It may have been but partial, as it was not detected at the time, and may have become complete when the child was bathed and dressed, and when it grew strong enough to move its limbs.

Dr. W. Reynolds Wilson spoke of a case of supposed epiphyseal separation of the femur, with reference to the manipulative procedure which might have been responsible for the lesion. The fœtus, in the oblique position, namely, with the back forward and the head in the left innominate fossa, presented by the right shoulder. The right arm was prolapsed. He anæsthetized the patient and attempted to perform podalic version. An attempt was made to grasp both knees of the fœtus and bring the breech to the inlet, allowing the child to ride up out of the pelvis. In an attempt to grasp both knees, he found the greatest difficulty in rotating the child; but in making a second attempt, when he seized the upper knee only, the child was rotated without difficulty. It was still necessary for him to use great force to deliver the breech. As he extracted the breech, he felt distinctly what impressed him as a separation of the deeper structures of the anterior thigh. He afterwards dissected the child, which had been born dead, and studied the femur carefully. He found no fracture and no epiphyseal separation. Experimentally he wished to see what the bone would stand. He found that it resisted considerable force. In attempting, also, to separate the epiphysis at the head of the femur, he found that the juncture was protected by the capsular ligament which is carried down to the periosteum of the shaft proper, a condition of the parts which seems to be especially adapted to the protection of the continuity at this point. It appeared to him that the condition of ossification in utero must necessarily have much to do with the fractures and separation of parts of the bones, the seat of lesion found after delivery. In his examination of the bone of the femur, he was impressed with the spongy condition of the upper and lower portions of the shaft, also with the cartilaginous condition of the head of the bone.

DR. JOPSON remarked that since fracture of the femur at the time of birth is somewhat rare, he would report a case that he had seen two or three years ago at the Children's Hospital, in an infant three or four days old. The seat of fracture was about at the junction of the middle and upper third. There was marked tendency to flexion of the upper fragment, as in the first case reported by Dr. Wilson, in which the bone became united in that position. The child was several days old at the time of its first visit to the hospital, and the spasm of the muscles at this time was very great, probably due to the fact that the fracture had received no treatment up to that time. He treated it by applying a lateral pasteboard moulded splint, such as is often used with good results in fractures of the femur in infants; but the spasm was so great that the deformity had returned on subsequent visits. After two or three visits, the father discontinued bringing the child.

DR. WHARTON said that he had seen quite a number of cases of fracture of the femur in infants. These are usually in infants brought to the Children's Hospital, varying from a few hours to a few weeks of age. In many of these cases he could not find, in obtaining the history of the case, that the labor had been a difficult one. He was inclined to think in the majority of cases that the injury resulted from accidents after birth. In many cases the child had been allowed to fall, and in very few cases was there history of difficult or instrumental labor. In the majority of cases the injury seems to be in the upper third or near the middle of the shaft of the femur, and in such cases he usually found that there was an anterior deformity, due to flexion of the thighs, the upper fragment being drawn upward. He had been able to correct the deformity, and get satisfactory results without resorting to osteotomy. He had done osteotomy for correction of deformity following fracture of the thigh in older patients. In one case, a girl nine or ten years of age, there was a marked deformity in which a very good result followed an osteotomy. He had seen several fractures of the humerus in infants, coming under observation a few days after birth, which had apparently resulted from some manipulation during labor. He had also seen one or two cases of fracture to the clavicle following labor; but in his opinion fracture of the femur was much less common from labor than was supposed, and often fracture accredited to labor was due to some accident after labor.

DR. RODMAN said that recently he had seen a premature child at seven months, and very badly developed, who had a fracture of the right femur, with marked deformity. He had been asked to see the case with the attending physician on account of the fact that the latter feared to give an anæsthetic to such a premature and poorly developed child. He was able later to bring the limb into very good position without the aid of an anæsthetic.

DR. STEINBACH remarked that among the cases of fracture in infants which he had seen was one of fracture of the femur about the junction of the middle and upper third, with displacement of the upper fragment upward and outward. The breech had presented, and the accoucheur had experienced difficulty in extracting the child by hooking the index-finger into the groin. He saw the child on the fourth day. The fracture was a complete one. In treatment he used the inclined plane. Wire was shaped to the buttock and to the back of the thigh, which was flexed upon the abdomen, and the leg, which was flexed upon the thigh, securing these with a plaster bandage which held the fragments in firm position. The whole abdomen was surrounded by several turns of a like bandage. Within about sixteen days there was perfect union and the dressing could be dispensed with; only one dressing being necessary for the purpose. The child rested comfortably. The dressings were not soiled during defecation.

DR. WILLARD said that he had seen several cases of fracture of the femur occurring during delivery, and, although the fracture frequently was not discovered until several days after birth, yet on questioning the mother or nurse they admitted that the child had cried whenever it had been handled. It seemed to him that this late discovery of these fractures explains the statement of Dr. Wharton attributing these injuries to falls after birth. In many cases the fracture has been produced by the application of the hook in the groin; direct traction upon the femur, instead of dislocating the head or carrying off the epiphysis, has resulted in fracture. He had always dressed these injuries immediately with plaster of Paris from the thorax to the foot, making strong traction on the fragments and putting them in position at the time. In every case he had had good union without any noticeable deformity, and union has always been speedy.

DR. H. AUGUSTUS WILSON said that he believed that in a large majority of cases the so-called obstetric fractures are coin-

cidental, and not due to the obstetric procedures. He believed that they were, in the majority of cases, intrauterine, and he was drawn to that conclusion by statements made that fractures have been discovered at the time of birth, or shortly afterwards, in cases where the births have been very easy, and, in addition, by the statement of Dr. W. Reynolds Wilson in showing the tremendous power employed in podalic version in the case reported by him without injury to the bone.

He had tried his best with a number of fœtal femurs to break them by some such manipulation as Dr. Davis had resorted to. He had been unable in one of them to produce a fracture above the middle third. He had been able to produce a fracture at the middle third, and it was done by a pull and a twist at the same time. But in the case reported by him the fracture had occurred just below the trochanter, where the bone is thicker at the time of birth than the middle of the shaft, and where the strain would be possibly not as great as it would be either at the hip-joint or middle third; so he felt that Dr. Davis, with the strong hand and finger that he possesses, is unable to produce a fracture by his method of procedure.

In conclusion, he directed attention to the medico-legal aspect of the subject under discussion. He believed there was more than enough evidence that this fracture did not occur at birth, but previously, due to faulty process of ossification, and that it was a coincidence that forcible delivery was instituted.

ANGINA LUDOVICI.

By GEORGE G. ROSS, M.D.,

ASSISTANT SURGEON TO THE GERMAN HOSPITAL.

LUDWIG'S angina, or phlegmonous cellulitis of the floor of the mouth, is a comparatively rare affection. It is a disease which is so rapid in its development, and is attended by symptoms so distressing in character and accompanied by such a high rate of mortality, that any addition to the literature extant upon the subject may be of interest.

Ludwig, of Stuttgart, in 1836 was the first to describe the disease in detail, hence the name.

The disease is an infection of the thick layer of loose connective tissue which fills in the space between the symphysis of the jaw and the muscles of the floor of the mouth. This tissue is rich in lymphatics and blood-vessels, and contains the ducts of the sublingual and submaxillary glands. The disease may be either primary or secondary.

Primary infection may arise from wounds or ulcerations of the floor of the mouth and carious teeth; retarded development of the third molar or so-called wisdom tooth is an especially fruitful source of the trouble. Frequently a third molar will develop in the angle of a jaw already filled with teeth, causing pressure necrosis of the tooth and the portion of alveolar process of the jaw forming its bed, thus giving rise to an abscess and a subsequent infection.

The secondary infections arise in conjunction with those infectious diseases which are accompanied by manifestations in the mouth, *e.g.*, diphtheria, scarlet fever, tonsillitis, etc.

An interesting discussion has arisen as to the differentiation of the acute infectious diseases of the larynx, pharynx, and floor of the mouth. Semon (Royal Medical and Chirurgi-

cal Society, London, 1895, Vol. lxxviii, pages 181-238) claims that "the various forms of acute septic inflammation of the throat and neck, hitherto considered as so many essentially different diseases, are in reality so pathologically identical that they merely represent degrees varying in virulence of one and the same process, that the question of their primary localization and subsequent development depends in all probability upon accidental breaches of the protecting surface through which the pathogenic micro-organism, which causes the subsequent events, finds an entrance, and that it is absolutely impossible to draw, at any point, a definite line of demarcation between the purely local and the more complicated, or between the œdematous and the suppurative forms."

He reports fourteen cases, all of which were of the secondary type of infection. It would seem clear, from his cases, to consider the acute septic infection of the larynx and pharynx as one and the same disease, and, so far as the character of the invading micro-organisms is concerned, the primary may be included.

However, in true angina Ludovici the course is different and the infection essentially primary. The point of entrance is in the mouth proper, and the disease manifests itself primarily in the floor of the mouth, and secondarily in the pharynx and larynx.

The pathology so far as known is very similar, if not identical, with that of erysipelas. The organisms which have been discovered, from the researches of modern investigators, are the streptococcus and the staphylococcus. It has been suggested that there is some organism which is especially virulent and active in this disease, but as yet it has not been discovered.

G. Leterier ("Du Phlegmon sublingual dit Angina," Thèse, Paris, 1893) has collected thirty-one cases with thirteen recoveries. This series includes cases collected from old literature, and the mortality is therefore higher than at present. Early recognition of the disease and prompt surgical interference will in all probability still further reduce the death-rate. Spontaneous cure by rupture of the abscess into the mouth

may occur, but the majority will terminate fatally unless operation is instituted.

The symptoms are marked from the onset of the disease. They develop very rapidly and are of the greatest severity. Frequently, in a few hours after the earliest manifestation of the disease, a hard swelling will be found between the arch of the lower jaw and the hyoid bone. The swelling spreads rapidly, soon involving the neck and face in a hard, dark red, brawny induration. Respiration is soon impeded by involvement of the deep connective tissue of the neck. The pharynx and larynx become involved, and attacks of acute dyspnœa with cyanosis supervene. The swelling may spread downward to the anterior mediastinum and on to the chest wall. Inspection of the mouth, although unsatisfactory, due to fixation of the jaw, will disclose the sublingual tissue to be so œdematous as to push the tongue against the roof of the mouth. In the early stage the swelling is unilateral, but soon both sides become involved, and deglutition becomes difficult or impossible. Supervening the local condition a marked general sepsis occurs.

CASE I.—Dr. W. S., while studying in Berlin, had an acute infection of the submaxillary region arising from a necrotic and undeveloped wisdom tooth. The inflammation developed rapidly, and in twelve hours from the onset of the attack the symptoms were so marked that operation was demanded without further delay. The wisdom tooth being pried away from the last molar, fetid gas and pus escaped; the inflammatory mass in the submaxillary region was then incised. The symptoms rapidly subsided, only to recur a few weeks later, when he was again operated upon and the offending tooth chiselled out.

CASE II.—Carl S., Austrian, aged twenty years. Family history good. Personal history excellent. Gastric fever at the age of six; no venereal trouble. Uses alcohol moderately and tobacco in excess.

He worked his way to this country, and attributes his bad teeth to neglect during the voyage. He is a printer by trade, but had been a farm-hand for the three months of his residence in

America. He had had toothache for four days prior to his admission to the German Hospital, September 29, 1900, about 8 P.M. At the time of admission there was some swelling and induration in the left submaxillary region, red and angry looking, very painful to touch, and interfering with the motions of the jaw. Respiration, 24; temperature, 102° F.; pulse, 86, full and bounding. Three hours after admission he awoke with a marked dyspnœa and cyanosis, which partially subsided, only to recur again with increased severity. The attacks of dyspnœa seemed to come in periods, and were relieved by violent voluntary inspiration. He would grasp the porch railing, extend his neck forcibly, and thus enable himself to inspire enough oxygen to last for a few minutes. The house surgeon prepared for an immediate tracheotomy, which, however, was deferred from time to time upon the amelioration of the attacks. By 12.30 the induration and swelling had extended from the angle of the jaw on the left side to that of the right and down the neck to the clavicles. The hyoid bone and pomum Adami could not be made out. The swelling was hard, very painful, dark red, and brawny in character, not unlike that of erysipelas.

The chin was held well advanced and rigid. The jaws were separated about half an inch, and between the teeth the under surface of the tongue could be seen; the latter being pushed upward to the hard palate by the œdematous sublingual tissue. The jaws were forced apart, disclosing a general œdema of the anterior pillars of the fauces, buccal mucous membrane, and the sublingual tissues; the last two molars were carious, and an undeveloped wisdom tooth was present.

An incision was made into the œdematous sublingual tissue on both sides of the frænum. A considerable amount of bloody serum escaped, and in a few minutes his respiration became less labored. Ice-bags were applied, and the patient returned to bed; he slept for some hours. The temperature reached 104° F. and the pulse 118 by 5 P.M., September 30.

On October 1 the swelling had increased until it extended upward upon the face as far as the zygomatic arches and down upon the chest wall to midsternum. Fluctuation was now unmistakable for the first time just below the symphysis of the jaw. A few whiffs of chloroform were administered, and the abscess opened by an incision which went through the muscles forming

the floor of the mouth. The abscess cavity extended around the entire underside of the jaw from angle to angle. The pus which escaped was extremely fetid. As this stage of the proceeding was reached, the patient ceased breathing, necessitating an immediate tracheotomy, and this in a neck with obliterated landmarks. Respiration being re-established, the operation was completed by the removal of the offending teeth. A mallet and chisel were necessary for the extraction of the wisdom tooth. The patient reacted promptly. By the fourth day after operation two patches of impaired resonance could be made out, one in the right lung in the midaxillary line, the other at the left base. There was, however, no evidence of a frank pneumonia.

On the fifth day, a secondary abscess on the right side, extending from the submaxillary region to the zygomatic arch, was opened, which allowed a quantity of fetid pus to escape. Prior to the evacuation of this secondary collection deglutition had been impossible, and rectal alimentation had been resorted to. In a few hours he was able to swallow liquids freely. The tracheal tube was removed in thirty-six hours. The convalescence was progressive despite an attack of bronchitis. The after-treatment consisted of iron, quinine, and forced nourishment.

As a result of the inflammation of the larynx, aphonia has resulted. The condition of his larynx (as reported by the laryngologist) is as follows: "The larynx shows evidence of an attack of perichondritis. The vocal cords are hidden by the greatly swollen and thickened ventricular bands. The arytenoid cartilages are also obscured by swollen mucous membrane which also involves the interarytenoid space. There appears to be no paralysis of the laryngeal muscles, but their normal action in phonation is prevented by the greatly thickened condition about them. Directly in the centre of the laryngeal opening a passage sufficient for respiration leads down to the trachea, between the swollen ventricular bands."

The pathological report states the bacteriological findings as follows:

"Examination was made of the patient's blood and of pus from the wound, both taken October 2, 1900. The blood was removed from the median cephalic vein by means of an aseptic hypodermic needle after aseptic incision of the skin overlying the vein. A moderate quantity of blood was introduced into six

bouillon tubes and four agar tubes. These were examined on several occasions, but all remained sterile at the end of ten days. From the pus cover-slip preparations were made and several bouillon tubes and agar tubes were inoculated. The cover-slip preparations revealed staphylococci and streptococci. The inoculated tubes also revealed streptococci and staphylococci; the latter by further culture methods proved to be the staphylococcus pyogenes aureus. On October 6 another examination was made of the pus from the wound, cover-slip preparations and inoculations again being utilized. These again revealed the staphylococcus pyogenes aureus and the streptococcus pyogenes. The latter grew both in short chains as well as in long chains, many of them being excessively long. Blood count: Hæmoglobin, 63 per cent.; erythrocytes, 4,630,000; leucocytes, 9800."

There is another lesson to be learned from a study of Case II. The character and intensity of the symptoms and the destructive tendency of the inflammation lead to the isolation of the patient. The pathological findings indicate that the disease is in all probability erysipelatous in character, and therefore, in an active surgical hospital, these cases should be isolated.

TRANSACTIONS OF THE PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, December 3, 1900.

The President, DE FOREST WILLARD, M.D., in the Chair.

CHOLECYSTOSTOMY FOR OBSTRUCTION OF THE CYSTIC DUCT.

DR. HENRY R. WHARTON presented a woman, aged fifty-three years, who was admitted to the Presbyterian Hospital, January 23, with the history that for some years she had suffered with indigestion and intermittent attacks of jaundice, paroxysmal pain, chills and fever, which symptoms persisted, varying in severity, up to the time of her admission to the hospital. Upon examination it was found that she was much emaciated, weighing only sixty-seven pounds, and was deeply jaundiced; the abdomen was moderately distended, and palpation showed that the liver dulness extended downward beyond the umbilicus.

The patient was etherized and an incision made, and the gall-bladder was exposed with some difficulty, as it was very much contracted, being not over three inches in length and three-fourths of an inch in diameter, and as it was overlaid by the hypertrophied liver. When it was exposed and palpated it was found to contain several stones. It was also adherent to the surrounding tissues. As it was found impossible to bring the gall-bladder up to the surface of the wound and suture it to the tissues of the abdominal wall, the intestines were carefully packed away from the bladder with sterilized gauze, which was held in place with retractors, so that a free exposure of the gall-bladder was obtained. The gall-bladder was then opened and several stones were removed, and at the upper part of the organ a large-sized stone was found, a portion of which was impacted in the cystic duct, the remaining portion protruding into the gall-bladder. This was removed with

some difficulty. As it was found impossible to bring the edges of the gall-bladder up and suture them to the abdominal walls, the gauze packing was allowed to remain, and a large rubber drainage tube was introduced to the bottom of the wound, and the ends of the wound were closed with silkworm-gut sutures.

After the operation there was profuse discharge of bile from the wound, and the patient suffered from more or less persistent vomiting; the abdomen became markedly distended, the bowels remained constipated, and the patient presented decided symptoms of intestinal obstruction. The gauze packing was removed on the third day, and after this the symptoms of intestinal obstruction rapidly subsided, and the patient's condition became markedly improved. Bile continued to escape freely from the wound for several weeks, the patient's health improved, and at the end of four weeks the wound was firmly healed, and the passages showed that the bile was escaping by its normal route.

The patient was discharged from the hospital, April 14, in good condition. Examination of the patient, November 26, shows that she is well nourished, is in good condition, and weighs 100 pounds.

A COMPOUND FRACTURE OF THE RIGHT TIBIA AND FIBULA; GREAT CONTUSION OF THE LEG AND THIGH; COMPLICATED FRACTURE OF THE INTERNAL CONDYLE OF THE LEFT FEMUR.

DR. WHARTON presented a man, aged twenty-five years, who was admitted to the Presbyterian Hospital on the night of May 25, 1900, having been injured by being caught between cars in a freight wreck. On examination it was found that he had sustained a compound fracture of the tibia and fibula of the right leg, with great contusion of the soft parts, and an injury of the right knee and a contusion of the right arm. When seen by the reporter, about twelve hours after the injury, he found a compound fracture of both bones of the leg in the middle third, and the knee was held in partial flexion and could not be extended. The leg and thigh were greatly swollen and tense, and the vitality of the soft parts seemed threatened.

The patient was anæsthetized, and free incisions were made at several points through the skin and deep fascia to relieve the

tension, which were followed by the escape of a large amount of dark blood and serum. An examination of the injured knee showed that full extension of the leg was impossible, by reason of a fracture of the internal condyle of the femur, which appeared to be displaced downward into the joint, which caused locking of the joints in attempts at extension. As the vitality of the tissues of the leg and thigh seemed doubtful, and as attempts to reduce the fragment by manipulation were unavailing, it was decided at the time to postpone any operative treatment to reduce the fracture of the internal condyle. The compound fracture of the bones of the leg was dressed with a copious sterilized gauze dressing, and moulded binder's-board splints were applied to the leg and thigh to fix the fragments. A skiagraph was taken of the knee, and it was found that a mass of bone was wedged into the knee-joint. Three weeks after the injury, as the vitality of the tissues of the leg seemed assured, the patient was etherized, an incision was made over the inner portion of the knee-joint, and the seat of fracture of the internal condyle was exposed. It was then found that the internal condyle of the femur had been separated from the shaft of the bone, and had been so turned that the fractured surface of the bone was presenting in the joint, and the articular surface was turned towards the fractured surface of the femur. The fragment was carefully removed, a large drainage tube was passed into the joint, the ligamentous structures were brought together by chromicized catgut sutures, and the wound was closed by sutures. The fragment removed consisted of a large portion of the internal condyle of the femur, and represented a mass of bone two and one-half inches in length and one and one-half inches in width. After the removal of the fragment the leg could be placed in the extended position without difficulty. The limb was then held in the extended position and a plaster-of-Paris dressing was applied to the foot, leg, and thigh.

The patient did well after the operation. The drainage tube was removed on the fourth day by trapping the plaster bandage, and the bandage was not removed for a month. The patient was discharged from the hospital on July 29, a little more than two months from his admission, walking with crutches, and at this time there was some motion at the knee-joint. The patient was again examined on November 12, and it was then found that he was able to walk with a cane and had regained a very fair range of motion in the knee-joint.

IMPERFORATE RECTUM.

DR. WHARTON presented a two months' old female infant, who, when three days of age, was admitted to the Children's Hospital, October 19, 1900, with the history that at birth the anus was normal in appearance, and it was only after twenty-four hours that it was noticed that no fæcal matter escaped, that the child suffered from pain, that the belly became distended, and persistent vomiting occurred.

Upon examination he found the belly hard and distended. Examination of the anus showed that a probe or the tip of the finger could be introduced to a distance of an inch, and when the child cried it seemed that bulging of the bowel could be detected anteriorly. The anus was enlarged by an incision backward and the tissues were carefully divided, and when the incision had reached a depth of one and three-fourths inches, a bulging mass, resembling the rectum, was exposed in the anterior portion of the wound; this was opened by a small incision, and it was found to be the vagina. A careful dissection posterior to this failed to expose the rectum. The bleeding was then arrested by sutures and packing, and a left iliac colostomy was made. Upon opening the peritoneum a large quantity of thin pus gushed from the wound, and the small intestine which presented in the wound was injected. The small intestine was displaced, and the descending colon was brought up into the wound and sutured to its lower angle; gauze drains were next introduced from the upper portion of the wound into the peritoneal cavity for drainage. The colon was next opened and a free discharge of meconium occurred. Upon exploring the colon through the wound with the finger, it was found that the bowel terminated in a blind pouch about the region of the promontory of the sacrum.

The child improved after the operation, the vomiting ceased, and the abdominal distention disappeared. A certain amount of pus escaped by the way of the gauze drains; they were removed on the third day, and were not replaced. The upper portion of the colostomy wound was healed in a week, and the patient had satisfactory movements through the artificial anus. And now, a month after the operation, the child is taking nourishment well and is fairly well nourished.

Under the conditions presented, the case seemed to be a hope-

less one, and he was very much surprised upon seeing the case on the following day to find it doing well. The occurrence of a purulent peritonitis without rupture of the bowel was to him a matter of great interest in this case, and he regretted very much that no bacteriological examination was made of the pus which escaped from the abdominal cavity at the time of operation, to determine the nature of the infection.

INTERMITTENT INTESTINAL OBSTRUCTION DUE TO A BAND, SIMULATING APPENDICITIS.

DR. WHARTON further reported the case of a boy, aged nine years, who was admitted to the Children's Hospital, October 9, with the following history. Dr. Black, of Newcastle, Delaware, under whose care the patient had been before his admission, reports that for two years the patient had suffered from intermittent attacks of abdominal pain, referred to the right iliac fossa and radiating to the umbilicus. These attacks occurred at intervals of a few weeks or months, usually following the ingestion of indigestible food, and were so severe as to require the free use of morphia before he could be made comfortable, and the patient was not completely relieved until the bowels were freely moved. There was no fever during the attacks, and after they had disappeared the boy seemed in good health, with the exception of the fact that there was some tenderness on pressure in the right iliac region.

Upon examination of the patient, the abdomen was found moderately distended, and a mass could be indistinctly located in the right iliac fossa, near the location of the appendix. The patient was kept in bed for a week and a careful watch kept, and during this time had two attacks of pain, the last one being very severe, and was only relieved by the administration of morphia and the use of an enema, which produced a movement of the bowels. From the symptoms presented, with the absence of fever, it was thought that the attacks were due either to chronic appendicitis,—a rare condition in childhood,—or to the presence of a band which caught either the appendix or the small intestine. The possibility of a calculus passing through the ureter was also considered, and the urine was examined after the attack for the presence of blood. The bladder was also examined for stone. An incision was made over the region of the appendix, and upon

opening the peritoneal cavity and introducing the finger the appendix was located, and at the same time a band about three inches in length and one-eighth of an inch in width was discovered, which arose from the colon one and one-half inches above the origin of the appendix, and was attached to the pelvis near the point of exit of the iliac vessels. The appendix was long and contained several curves, and lay in contact with the band, but was not adherent to it. It was thickened, but presented no signs of acute inflammation. The band was divided, the appendix removed, and the wound closed. The patient after the operation presented no unfavorable symptoms, and was discharged from the hospital in three weeks, having had no further attacks of pain or obstruction of the bowel.

The symptoms presented in this case resembled those of intermittent intestinal obstruction by a band, but whether they were due to the appendix being caught by the band, or to the small intestine being obstructed by the band, is difficult to determine.

TREATMENT OF INTERMAXILLARY BONE IN CASES OF DOUBLE HARELIP.

DR. WHARTON presented, also, a child upon whom he had operated for the relief of double harelip, saying that in such cases he thought it always a difficult matter to determine just what to do with the intermaxillary bone or the tissues covering that bone. The usual procedure recommended is, if the intermaxillary bone is removed, to save the flap of soft tissues which covered it, and pare it down to make a V-shaped mass and include it between the upper part of the freshened lips in bringing the parts together. This he had seen done in many cases and had done it himself, but it has a tendency to make the nose flat. Some years ago he saw several cases operated upon by Dr. Ashhurst in which he simply saved the tissues, removed the intermaxillary bone, and allowed this flap to take any position which it naturally fell into; and in some of these cases the results were quite good, taking the place of the septum of the nose, making quite a respectable septum. Recently he had adopted this procedure in several cases and found quite satisfactory results.

DR. JOHN B. ROBERTS called attention to the fact that sometimes these mouths can be made to look a great deal better by

taking a piece out of the lower lip, which is relatively too big and liable to lap over.

OPERATIVE TREATMENT OF CIRRHOSIS OF THE LIVER.

DR. CHARLES H. FRAZIER read a paper with the above title.

THE OPERATIVE TREATMENT OF CIRRHOSIS OF THE LIVER.

By CHARLES H. FRAZIER, M.D.,

OF PHILADELPHIA.

A LABORING man, of middle life, was admitted into the medical ward of the University Hospital, May 10, 1900. He had contracted syphilis in 1882, and had always been a free user of alcohol and tobacco. His heart was enlarged, and a systolic murmur was plainly audible over the whole præcordia. The lungs were normal. Both the spleen and liver were enlarged; the upper margin of the liver was on a level with the fifth rib, and the lower border could be plainly felt below the costal margin. The abdomen was greatly distended with ascitic fluid, and the lower extremities were œdematous. The urine was an amber color, cloudy, its reaction acid, specific gravity 1019; it contained a trace of albumen and a few pus and blood-cells, but no casts. The administration of digitalis, theobromine, caffeine, diuretin, urea, strophanthus, and other diuretics had no appreciable effect upon the ascites. Paracentesis was resorted to on May 30, and repeated four times, at intervals of about two weeks, on which occasions 512, 485, 330, and 400 fluidounces, respectively, were withdrawn. The case was regarded as a rather hopeless one, and at my suggestion the patient was transferred to the surgical ward.

Operation, July 25, 1900. It was my intention to perform the operation under local anæsthesia; but after opening the peritoneal cavity, the manipulation elicited so much pain that it was necessary to finish the operation under ether narcosis. The parietal peritoneum of the abdominal wall on either side of the incision was rubbed quite vigorously with a gauze pad, and the omentum, which was very much thickened and contracted, sutured to the parietal peritoneum and to the margins of the wound. The fluid contents of the abdominal cavity were evacuated and the incision closed without drainage. Convalescence was uninter-

rupted; the patient suffered no ill effects from the operation. The wound healed throughout *per primam*. The history subsequent to the operation—since which three months have elapsed—is briefly as follows: The patient has been tapped twice, once on the thirteenth day, 328 fluidounces having been withdrawn, and again on the thirty-sixth day, on which occasion only 96 ounces were withdrawn. From that time to the present writing there has been absolutely no reaccumulation of fluid. The patient has gained rapidly in strength; he is no longer bedridden, goes out daily, and receives no medication other than enough citrate of magnesia to insure a daily evacuation of the bowel.

Remarks.—This operation purports to open another channel for the relief of the obstructed portal circulation. I say another channel, because there already exists a more or less free collateral circulation between the systems of the portal vein and the inferior vena cava. Thus, the coronary anastomose, through the œsophageal plexus, with the azygos veins; the veins of the cæcum and colon with the internal mammary; the hypogastric with the hæmorrhoidal; the veins of the hepatic ligament with those of Glisson's capsule; the veins of the round ligament with the epigastric. By inciting the formation of adhesions between the omentum and the abdominal wall and between the surfaces of the liver and spleen and that of the diaphragm, this operation furnishes an additional outlet for the blood of the obstructed portal system. The examination of specimens obtained at the autopsy table has proved beyond a doubt that the operation as conducted accomplishes this purpose. Thus, in the case operated upon by Lens, venous channels were easily demonstrable in the adhesions that had formed between omentum and peritoneum.

The technique of the operation is very simple. The operation should be performed preferably under local anæsthesia, as individuals afflicted with cirrhosis of the liver are usually alcoholics and belong to a class in which ether narcosis of itself has a very material effect upon the mortality. An incision three or four inches in length is made in the median line, or in the border of the rectus, above the umbilicus. The peritoneum of

the adjacent surfaces of the diaphragm, liver, and spleen, respectively, and the peritoneum on either side of the wound are scarified with a blunt curette or rubbed with a gauze pad. The latter is the better procedure, as it will give rise to less bleeding, at the same time exciting a peritonitis sufficient to insure adhesion between the opposed surfaces. The omentum is sutured to the parietal peritoneum for a distance of three or four inches on either side of the wound and to the margins of the wound itself. The evacuation of the fluid completes the operation, the wound being closed without drainage. In a number of the recorded cases tubular drainage was inserted through a suprapubic opening and removed about the fourteenth day. This step of the operation, I believe, should be omitted; it can have no beneficial effect upon the ultimate results, while it certainly introduces an additional element of risk, as in Weir's case, which died of purulent peritonitis, the tract of the drainage tube furnishing the avenue of infection. It may be necessary, if drainage is not introduced, as in the author's case, to tap the patient on one or more occasions during the time the adhesions and venous channels are in process of formation. The dressing is secured in place by broad strips of adhesive plaster, which are applied with the object of keeping in apposition the scarified surfaces of the liver, spleen, and diaphragm.

The chief indication for the operation is the presence of ascites due to obstruction of the veins of the portal system, when the obstruction itself is due to cirrhosis of the liver. It should be borne in mind, however, that the operation is not indicated in every case of hepatic cirrhosis with ascites; the operation is absolutely dependent for its success upon the retained function of the liver-cells. In other words, the absence of functional activity is an absolute contraindication. It has been suggested that the presence of cardiac or renal disease should constitute a contraindication, but this might be regarded rather as a relative than as an absolute one.

Apart from the risks attending any operative procedure upon patients with chronic visceral disease, there are certain well-recognized dangers peculiar to this operation. These have

been proven by the experiments of Eck, Hahn, and Tillmanns, who called attention to the serious consequences attending the entrance of the blood from the mesenteric veins directly into the general circulation. When Tillmanns ligated the portal or mesenteric veins, the animals died; when, however, he waited until he had established a collateral circulation by an operation similar to that above described, he found he could gradually cut off the venous blood going to the liver without such disastrous results. Hahn observed a number of nervous phenomena exhibited by dogs in which he had established a free anastomosis between the vena cava and porta. These nervous phenomena, which were nothing more nor less than evidences of auto-intoxication, were observed in the third case of Morrison's series. The patient recovered from the operation, but for a period of some ten months he exhibited certain nervous symptoms; they subsequently disappeared. Apart from demonstrating experimentally the dangers and origin of these nervous complications, the experiments of Hahn, Eck, and Tillmanns emphasize the necessity, as has been pointed out by Weir, of bringing about this collateral anastomosis gradually, so as to use the intravening capillary circulation as an assimilator, and thus avoid fatal toxæmia.

Results.—At the time of this writing, the records of but fourteen cases (including the author's) have appeared in literature. The number of operations therefore is so limited that no very definite conclusions can as yet be drawn. When we exclude those in which there was some error of technique, those in which there was an error of diagnosis, or those in which the operation was contraindicated, but eight cases remain. Of these none died (mortality, 0 per cent.), one was living and unimproved (12.5 per cent.), one living and improved (12.5 per cent.), and six were living and free from ascites at periods of three, four, six, twenty-four, twenty-four, and twenty-six months respectively (75 per cent.).

Though our experience is as yet very limited, I believe that in properly selected cases—and by that I mean those cases (1) in which the liver is cirrhotic; (2) those in which there is

reason to believe the liver-cells are not devoid of function; (3) those in which internal medication (particularly iodide of potassium) and paracentesis fail to afford relief, or, in other words. in utterly hopeless cases, and (4) those in which there is no reasonable contraindication—the operation has a future. The cases are so hopeless, the technique so simple, the dangers so trivial, and the outlook so promising, that the prospects of this mode of treatment becoming an established one seem bright. That surgeons now have at their command a method, both rational and reliable, of affording relief, sometimes temporary but often permanent, to intractable cases of ascites seems to me a very fair conclusion to draw from the accumulated evidence.

DISCUSSION.

DR. JOHN B. DEAVER said that he had seen a cure following simple tapping in the case of a man who had every indication of cirrhosis; he was frightfully distended. He could not breathe lying down, had been sitting up in his chair for several nights previous to the tapping. The man never had a recurrence after his tap and lived three or four years. He has since died, but did not die of any symptoms referable to the liver. He was an alcoholic as well as a specific case.

DR. WHARTON said that some years ago he did an abdominal section in a case of cirrhosis of the liver for Dr. Pepper, simply opening the abdomen and draining away the fluid; and this case improved very much for a time. He lived six or eight months, but finally died. He was very comfortable, and did not require tapping after the incision.

DR. JOHN B. ROBERTS said that he had two patients under care for sometime upon whom he expected to perform this operation. He had waited because both cases had cirrhotic kidneys as well as cirrhotic liver, and had not been in good condition. One had evidences of œdema of the lungs, and appeared to be on the verge of delirium tremens when he first saw him. The jaundice was quite marked. In both cases the urine has been scanty in amount. He intended to simply make an incision big enough to get one or two fingers into the abdomen, smooth out the omentum, and with a long curved needle make sutures through the skin and

muscles, and tie the catgut sutures on the outside. It seemed to him that the rapidity with which this operation could be finished, and the fact that one only needs a small incision, would enable one to do away with general anæsthesia. Cocaine infiltration of the site of incision would be sufficient. General anæsthesia is rather risky in cases of cirrhosis of liver and kidneys, hence this method would be desirable.

[Since the discussion, Dr. Roberts has operated upon the two cases mentioned by the small incision and cocaine anæsthesia.]

Dr. Frazier said that he had hesitated writing up this case for publication when but thirteen months had elapsed since the operation had been performed, fearing that one might advance the criticism that the results obtained were those of operation *per se*. He thought, however, that the results had been such as to warrant one in attributing them to the nature of the operation itself. As to the technique, this is in every sense of the word simple, once the operator has decided upon his plan of procedure. He must decide, first, whether he will confine his operation to the immediate neighborhood of the wound; secondly, whether he will extend his operative field to the diaphragm, liver, and spleen, and, thirdly, whether he will employ drainage. Some operators scarify not only the peritoneal surface of the abdominal wall on either side of the wound, but in addition the adjacent surface of the liver and diaphragm and of the spleen and diaphragm, thereby exciting the formation of a greater number of adhesions.

He had been loath to carry out such an extensive operation in this case, that is, an operation which subjected such an extensive surface of the delicate peritoneum to traumatism. He therefore omitted so much of the operation as has to do with liver, spleen, and diaphragm. In almost all cases hitherto reported a drainage tube has been inserted through an additional wound in the suprapubic region, and this has not been removed until there has been no further accumulation of fluid. He was convinced that this step in the operation should be omitted; that it in no way contributes to the result, and furnishes an additional risk, for there is constant danger of the peritoneal cavity becoming infected along the drainage-tube tract. He much preferred to resort to paracentesis, should the occasion demand it, during the period in which the collateral circulation is being established.

WRY-NECK.

DR. DE FOREST WILLARD presented several cases of torticollis; some operated upon by excision of the spinal accessory nerve; others by section of the sternocleidomastoid.

In one of the cases, three years of age, the contraction was noticed about a month after delivery by version. There had been no known hæmatoma of the sternomastoid; but it is probable that there had been an injury to the neck, or more probably to the spinal accessory during birth. The contraction was very marked, and the chin was rotated to the opposite side. The trapezius was also involved in the contraction. Section of the sternomastoid at the clavicle and sternum having failed to give relief, the child at two years of age was subjected to excision of an inch of the right spinal accessory, the nerve being reached anterior to the upper third of the muscle. Although the excision was a thorough one, the child, now one year afterwards, has no recognizable paralysis on the right side, the other muscles of the neck having assumed all necessary functions for complete movements of the head and neck; the rotation of the chin and the obliquity of the head have been almost entirely relieved, and the result is thoroughly satisfactory.

The securing of this result is undoubtedly largely due to the fact that after recovery from the operation the child was treated for several months with both active and passive gymnastic exercises of all the muscles of the neck.

Another case presented was one which had refused operation, in which the deformity had increased rapidly, so that there was marked distortion of the cervical vertebræ, with rotation. The transverse processes could be plainly felt, and the distortion of the neck had naturally produced lateral curvature of the spine. The case, which was of neurotic origin, could not be benefited except by a division of the spinal accessory, and probably of the high cervical nerves. As this has been refused, the case was being tentatively treated by strong head and foot extension in the horizontal position.

Another case was of the intermittent variety and of nerve origin. When the boy was placed upon the table for operation, the contraction, which had been confined to the sternomastoid, was found to be so entirely relieved by the anæsthetic that the opera-

tion was postponed, and he was put upon a course of neck gymnastics together with tonics, iron, strychnia, gelsemium, etc., with entire disappearance of the affection. Education in neck gymnastics was insisted upon as one of the most essential points in the cure.

Other cases of both open and subcutaneous division of muscles were also exhibited.

In his remarks Dr. Willard said: Simple cases of torticollis are so simple that a surgeon is very liable to be too hopeful in his prognosis when he first examines a complicated case. In wry-neck the differences in form, grade, and curability are most remarkable. A simple contracture of the sternomastoid may often be relieved by gelsemium or other medicinal agents; or, if permanent, by simple myotomy and gymnastics, and a perfect result secured. On the other hand, in a spastic case, or one of nerve origin, every muscle of the neck, and even the shape of the vertebræ, may be so involved that all forms of medical and surgical treatment will fail to cure. He knew of no more satisfactory results than those secured in simple cases, and he had met with few more troublesome ones than those encountered in complicated torticollis. A consideration of the causes of wry-neck shows that it is not strange that this variation exists. A simple inflammatory cause may be transient, or it may become permanent; a neurotic cause may be severe for a time, but it may be relieved by the improvement of the general condition; a continuous nerve irritation may, and usually will, prove most stubborn. Let the surgeon therefore be wary in his prognosis until he has watched the progress of the case. Even a simple contraction of the sternomastoid continued for years may not only give asymmetry of face and eyebrow, but also of jaw, cranium, and spinal column, and many cases of lateral curvature of the spine are traceable to wry-neck.

Great care must be taken that a case of cervical spinal caries be not mistaken for a case of torticollis, especially when there is marked rigidity and fixation in an old case. Abscess of the glands, traumatism, rheumatism, myalgia, etc., must be carefully eliminated.

In the treatment of wry-neck, myotomy is usually delayed too long, and the permanent changes above alluded to then prevent a perfect cure. As to the question of open or subcutaneous section of the muscles, present aseptic methods favor the open section as

the more certain procedure, except in simple forms in females. In former years, when he always operated subcutaneously, he fortunately never had an accident, but such accidents had occurred to the most capable surgeons. One case he remembered in the practice of a most skilful operator, where the top of the pleura was wounded and fatal septic pleurisy followed. The neighborhood of the great vessels at the top of the sternum always renders one anxious. If the deeper sternal and clavicular fibres are implicated, the open plan is always the best. When a contraction is of long standing, real muscle-fibre shortening has occurred; and open section of the mastoid insertion also is often necessary, the scar from which can be concealed in the hair. When complicated cases are encountered, the most serious difficulties arise. If only the sternomastoid and trapezius are affected, the spinal accessory is probably alone at fault. This nerve may be reached high up by an incision along the anterior border of the sternomastoid, or it can be reached from the posterior border. He usually preferred the former route. The nerve passes along the transverse process of the atlas, and can usually be found as it leaves the digastric muscle and passes to the posterior border of the sternomastoid a little above the level of the hyoid. Paralysis of the trapezius and the sternomastoid, more or less complete, will of course follow, but in the majority of cases this is of advantage in restoring the equilibrium of the head.

Stretching of the nerve so seldom accomplished anything permanent in his past experience, that he now always excised a large portion, an inch or more, if the nerve can be drawn out.

The complicated mechanical apparatus described in books is practically useless in any case, whether of tonic or clonic spasm. After operation, a simple cap made with circular and oblique bandages to the head is the most satisfactory. To this can be attached two elastic straps passing one in front and the other behind the shoulder, and fastened to a closely fitting waist or corset. Later, a circular occipitofrontal strap with buckle and two straps passing over the top of the head can be retained in place, from which an elastic strap can be attached to a corset or plaster-of-Paris chest-band.

The most important part of the after-treatment consists in the long-continued use of muscular gymnastics of the neck, with stretching, massage, etc. This is most helpful of all things in giving relief.

Neurectomy of the spinal accessory has not received abroad the attention which it deserves, but, following the lead of American surgery, Continental surgeons are wisely turning their attention not only to this operation, but also to resection of the cervical nerves.

When the deep muscles on both sides are affected, medicinal and hygienic measures are usually more effective than operative. Naturally, if the true cause, as in complicated cases, lies in the cephalic or spinal centres, a complete cure will not be obtained. Faulty diagnosis as to the muscles involved is probably the most frequent cause of error.

If the splenius is affected on one side, the face is rotated in that direction, while a spasm of the sternomastoid alone rotates the chin to the opposite side. Unfortunately, the complexity of the muscles involved, and oftentimes the long continuance of the contraction, has so distorted the cervical vertebræ that a complete rectification is impossible; therefore an early operation before these bony changes occur is advisable.

In the still persistent cases after section of the spinal accessory nerve, the spinal nerves should be divided. The second and third cervical spinal segments supply the sternomastoid, trapezius, and scaleni muscles, and both the second and third nerves emerge from the canal above the second spinous process. The incision to reach them, therefore, must be high up, as the distance to the foramen magnum is but short. The posterior divisions of the second and third can be reached either by transverse or by longitudinal incision, preferably the former, extending from the median line two and one-half to three inches. The trapezius must of course be cut across. The second cervical nerve, the great occipital, will probably be first seen, and may be traced through the complexus muscle, which may be divided so that an entire section of the nerve may be made back to its emergence from the spine. The first nerve lies beneath the vertebral artery, and is close to the atlas. The third cervical lies below the second cervical spine. The search for these nerves is a troublesome one.

When the rotary muscles are affected, this high division of the cervical nerve is helpful; but it must be remembered that rotation of the head may occur without involvement of these rotary muscles, especially if the splenius of one side is affected, and the sternomastoid on the other. There are many varieties of

this rotary deviation dependent not only upon the muscles involved on the one side, but especially in the complicated cases, where both sides are included.

These cases of nerve origin indicate, of course, either spinal or cerebral involvement, and are therefore to be treated essentially as neuroses, whether the spasms be tonic or clonic. When the head is thrown directly backward, it is probable that both trapezii are involved. He summed up his views in the following conclusions:

(1) Wry-neck is due to such a variety of causes that the prognosis should be guarded until the actual cause is discovered.

(2) Early open section of the sternal and clavicular insertions of the sternomastoid muscle is in simple cases curative, provided the operation is followed by continued neck-muscle gymnastics. Additional section of the mastoid insertion is necessary in more severe contractions.

(3) Early operation will prevent bony distortion and resultant lateral curvature of the spine.

(4) In cases of neurotic origin, resection of the spinal accessory nerve is most helpful, and, in still more complicated cases, section of the upper cervical nerves is to be recommended.

Dr. John B. Deaver asked Dr Willard if he had had occasion to resort to muscle-splitting in these cases. He operated on a lady sometime since who is said to have had torticollis for a number of years. She had no distortion of the cervical vertebræ in the shape of curvature, but had a very decided shortening of the affected sternomastoid. He could not convince himself that the operation for the spinal accessory nerve would suffice. Therefore he exposed the muscle, split it obliquely in the central part and sewed the split ends of the muscle together. The woman secured a perfect result and remains perfectly well.

He had had occasion to do likewise in flexion of the fingers, in consequence of contraction of the deep flexors of the forearm. He had one young woman who could not extend the fingers, but by splitting all the muscles and stitching them that woman has now as good function of that hand as she has in the other hand. He never had occasion to resort to muscle-splitting in a case of torticollis except the one reported.

Dr. Wharton said that in a recent case he split the sternal tendon of the sternomastoid and lengthened the tendon by split-

ting, then dividing it, and then did an oblique section of the clavicular attachment of the muscle. In this case the result was very satisfactory.

DR. WILLARD said that he had employed muscle-splitting with success in just such cases as Dr. Deaver speaks of in the forearm. It acts admirably in contraction of the flexors, the section being made high in the forearm instead of cutting off the origins of the muscles at the elbow. He had never used it for torticollis. It would seem to him that any case that would be benefited by such a section would also be benefited by simple myotomy, open or subcutaneous, of the sternal and clavicular attachments of the sternomastoid. He saw no objection, however, to the operation, and it might be safer because the muscle could be lifted out and the section need not be made as near to the root of the neck in the proximity of the great vessels. At the base of the neck we are liable to meet with accidents more than any other part.

PLASTER OF PARIS AS AN IMMEDIATE DRESSING AFTER FRACTURE OF THE LEG.

DR. WILLIAM G. PORTER presented two boys, brought from the hospital to illustrate the application of a dressing which he had been using for a long time in the treatment of fractures of the leg. He demonstrated this dressing before the Academy a few years ago. It is a plaster-of-Paris dressing which is applied in the following way. The limb is first carefully set under ether if necessary, firmly held in position, and a flannel roller bandage carefully applied from the roots of the toes to above the knee-joint about the junction of the middle and lower thirds of the thigh. A block tin tape is then placed on the front of the limb, moulded accurately to it and held in position. The plaster-of-Paris bandages are then applied in the ordinary way, and are at once cut through with a sharp knife on the block tin tape as a guide, which is then removed and an ordinary muslin roller bandage applied over all to secure the dressing. He had used this dressing for the last fifteen years as a routine dressing in all cases of fracture of the leg, applied at once as soon as he took charge of the case. There is no preliminary treatment by a fracture-box or any other appliance. If there are blebs, either serous or sanguineous, they are evacuated and boric ointment, or some similar

application, used. If the case is seen early and the dressing is promptly applied, there is, as a rule, no inflammatory swelling such as usually follows such fractures when treated in a fracture-box; and even should inflammatory swelling appear, the plaster having been split down yields, and there is no danger of strangulation, as there would be in a fixed and immovable plaster dressing. These two boys illustrate both the immediate application of the dressing and one of them its application to a case in which there was great contusion, the formation of blebs, and danger of the formation of a compound fracture by sloughing of the integuments. With this dressing a patient can occupy any position in bed which is most comfortable for him. He can sit up in a chair; can walk on crutches, and frequently, by means of it, can attend to his business during the whole time of the treatment of his fracture. If there is much contusion, the block tin tape is applied directly to the skin under the flannel bandage. If not, it is applied, as described, outside of it, and on the following day the cotton roller is removed and the folds of the flannel bandage are cut through with a pair of scissors, the limb inspected, any applications which may be needed made to it and the cotton roller reapplied. Any one who has been compelled to lie with his limb in a fracture-box for weeks must appreciate the advantages of this dressing.

DR. JOHN B. DEAVER said that since Dr. Porter made his first communication to this Academy, they had practically put it into effect in the German Hospital. They scarcely know what a fracture-box looks like. They put them up as Dr. Porter has indicated immediately upon their being received in the hospital. It is especially applicable to children. In cases developing delirium tremens and traumatic delirium it is particularly good. The precaution of following out Dr. Porter's instructions of cutting down is essential, so as to avoid gangrene, which is known to occur. He had had quite warm discussions with his house doctors as to putting a limb up in plaster which was greatly swollen. The next day he would find that the patient was in splendid condition, much more so than before he was dressed. That was their experience in the majority of cases; of course, there are exceptional cases. They do not confine it to simple fractures, but extend it to compound fractures; and all know that it relieves anxiety and makes the convalescence a pleasant one in comparison with our former mode of treatment with the fracture-box.

DR. WILLARD said that in his experience there was no plan of treatment of fractures in children that is at all comparable with the proper application of plaster. In fractures of the thigh it is essential to fix the hip-joint, carrying the dressing from thorax to toes. A child then cannot displace his limb; you can move him about, carry him up-stairs and out-doors with perfect satisfaction and without any danger of disturbing the fragments. When properly used, this plan of treatment secures absolute rest to the fragments, maintains thorough apposition, and yields the very best results.

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